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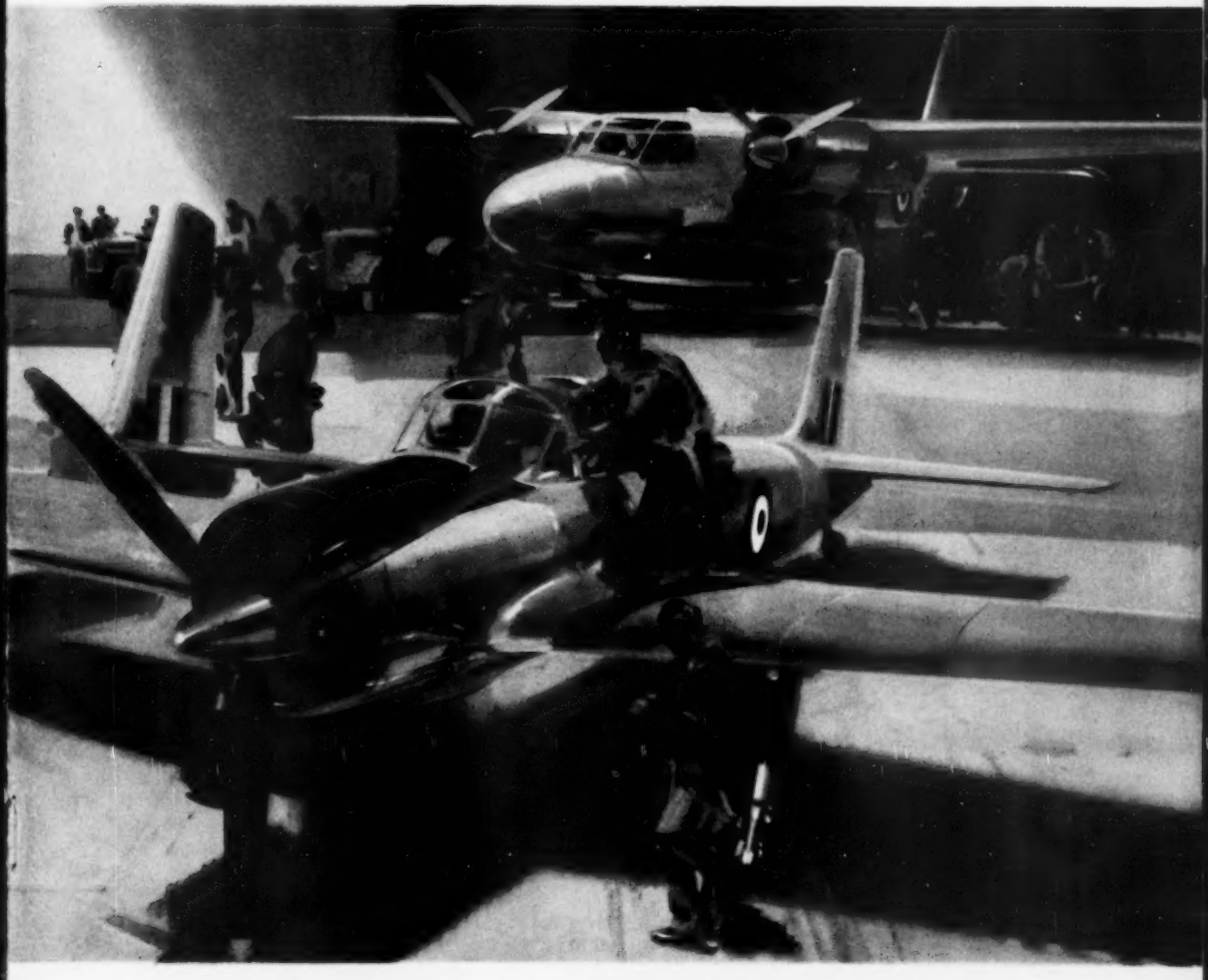

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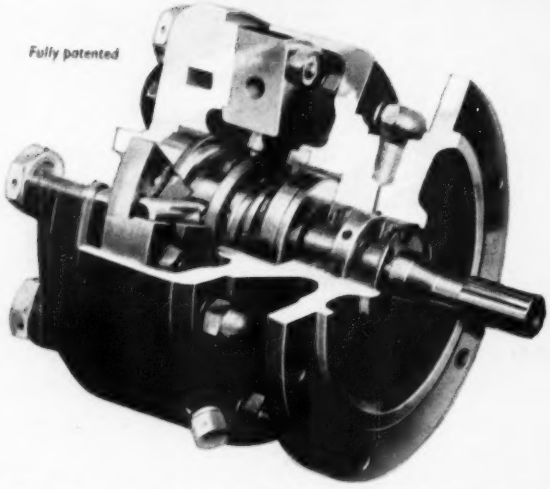

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This pump is extensively used—it is the heart of many hydraulic systems and the source of power for the Lockheed 'Servodyne' system of power assistance for flying controls, used on the 'Comet', the de Havilland 110, the Grognard S.E.2410 and other modern aircraft. It is also used as the source of power by aircraft firms having their own servo systems, and is on the Canberra shown above.

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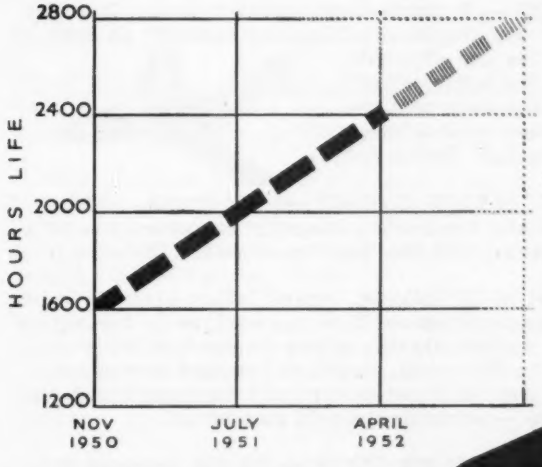

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A

UNITED AIRGRAM

UNITED AIRCRAFT EXPORT CORPORATION

FRENCH AIRCRAFT MANUFACTURER LICENSED TO BUILD SIKORSKY S-55s --Signing of an agreement under which the Sikorsky S-55 will be built in France by Aero du Sud-Est (Societe Nationale de Constructions Aeronautiques du Sud-Est) was announced on February 1, 1952. This latest agreement gives Sikorsky Aircraft two licensee manufacturers in Europe. Westland Aircraft, Limited, in England, has had a S-55 license since November, 1950.

PAN AMERICAN TO USE SUPER-6 CLIPPERS --On May 1 Pan American World Airways will commence operation of a new trans-Atlantic tourist-class service with a new plane specifically designed for low fare, long-range, mass air transportation.

The plane, to be known as the Super-6 Clipper, was developed by Douglas Aircraft Company from the DC-6B. It is powered with four Pratt & Whitney R-2800 (CB-17) engines, each capable of developing 2,500 h.p. -- approximately 100 more on take-off than DC-6B power plants. Range of the Super-6 is 800 miles longer than the DC-6B; gross weight allowance is approximately 7,000 pounds greater; and speed is higher. Pan American has 39 Super-6s on order.

GRUMMAN AIRCRAFT UNVEILS NEW NAVY FIGHTER — A swept-wing successor to the Grumman "Panther" is being turned out on the production lines of Grumman Aircraft at Beth Page, L.I., it was announced recently. The new aircraft, has been called the "Cougar," and like its predecessor is powered by a Pratt & Whitney J-48 Turbo-Wasp centrifugal-flow jet engine. Panthers have been used extensively in Korea by the U.S. Navy and the U.S. Marine Corps.

AIR FRANCE PLACES SUBSTANTIAL ORDER WITH HAMILTON STANDARD — Air France, which operates the world's largest network of airline routes, recently announced the purchase of a quantity of propellers and parts from the Hamilton Standard Division.

The equipment will be used on a fleet of 10 Lockheed Constellation aircraft which is being built for Air France. The three-bladed propellers the airline is buying are the same basic type used on nearly all postwar airline planes in America and on about half of all the passenger planes in the world. Hamilton Standard propellers and accessories are now in use on more than 70.6 per cent of all European carriers--and counting Hamilton Standard licensees -- approximately 81 per cent.

PRATT & WHITNEY-POWERED BOAC STRATOCRUISERS SET NEW RECORD -- British Overseas Air-Ways Corporation recently completed its second year of operation of Boeing Stratocruisers on its North Atlantic route. The aircraft, powered by Pratt & Whitney R-4360 Wasp Major engines, made 1,446 crossings which totalled 6,620,610 miles during the past year. The first year's operations with Stratocruisers accounted for 930 North Atlantic crossings and 3,600,000 miles traveled.

PROCESS FOR NICKEL COATING OF ALUMINUM TO PROLONG PROPELLER BLADE LIFE —Development of a process for nickel coating of aluminum, hitherto considered impossible, was announced jointly last March by the Hamilton Standard Division of United Aircraft Corporation, and the Bart Laboratories Company of Belleville, New Jersey.

The plating process, which was developed for the U.S. Air Force and the U.S. Navy, is of major importance to Hamilton Standard because it protects propeller blades from pitting and erosion by spray thrown up in sea landings and take-offs.

Solid duraluminum propeller blades equipped with the new coating are already in service on Martin P5M-1 flying boats and Grumman UF-1 utility amphibians. Several hundred landings and take-offs with the two airplane types have conclusively demonstrated the coating's protective qualities. Tests at Hamilton Standard showed unplated blades lost approximately 20 per cent of their tip area while coated blades were relatively unharmed.

U.S. ARMY TAKES DELIVERY OF ITS FIRST H-19 CARGO HELICOPTERS —The first Sikorsky H-19 cargo helicopter was delivered to the United States Army in January, 1952. It is one of approximately 100 of the big 10-place craft which the Army has ordered from Sikorsky Aircraft for delivery during 1952.

Adoption of Sikorsky H-19s is a big step forward for the Army transport system. They will be used to speed the supply of ammunition, food, medical items and related goods to front line troops. In addition, they will transport troops to otherwise inaccessible areas. The craft will be operated by the newly-created helicopter transport companies of the Army Transportation Corps.

FORD MOTOR COMPANY LICENSED TO BUILD P&W J-57 TURBO-WASP —The Pratt & Whitney Aircraft Division of United Aircraft Corporation has licensed the Ford Motor Company to build its big, axial-flow J-57. The engines will be built under a production planning contract awarded to Ford by the U.S. Air Force. The J-57 has been chosen for the new Boeing B-52 eight-jet bomber, and is also to be installed on the Convair YB-60, and on high speed military fighters still under security restrictions.

EUROPE'S TOOLS HELP PRATT & WHITNEY MEET SHORTAGE —Already at work on vital production jobs at Pratt & Whitney Aircraft are the first of some 74 new machine tools which the company has purchased from European manufacturers during the past year.

These foreign purchases represent a total investment of over $1,700,000, and were made because Europe's machinery manufacturers could guarantee earlier delivery than manufacturers of comparable American machines.

Most of the tools which Pratt & Whitney has purchased abroad are the large, complex types which take many months to build. These include radial drills, horizontal and vertical milling machines, facing lathes, and boring mills.

These orders placed abroad represent only a very small portion of the new tooling which the Pratt & Whitney Aircraft Division has ordered since the beginning of America's military expansion program.

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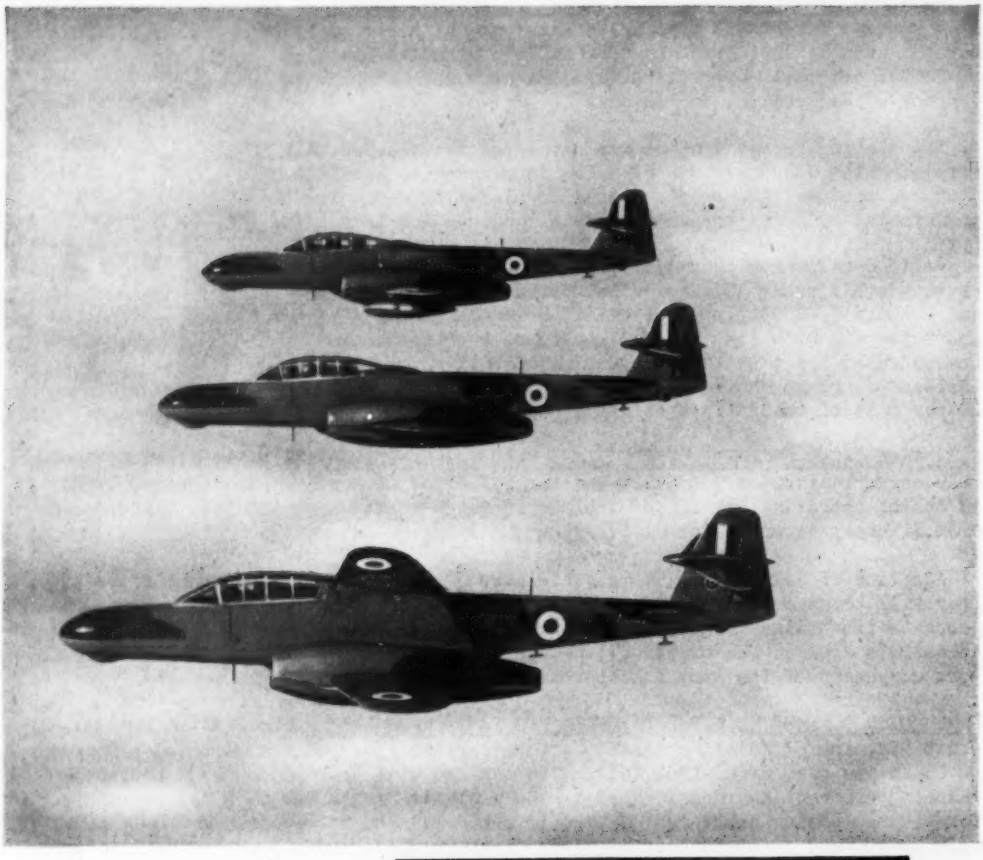

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Effective radar equipment and powerful armament enable the N.F.11 to seek out and destroy the night raider in all weathers. The quality and attention to detail apparent in the design of this machine, are also features of the wide range of aircraft finishes manufactured by Titanine.

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the economics of AIRPORT RECORDING

From the standards and recommended practices laid down by the Convention on International Aviation, it is evident that automatic recording for Air Traffic Control will sooner or later be expected at every airport. The problem of high costs has hitherto caused natural hesitation on the part of some airport authorities in implementing these requirements. In this series of advertisements, the answer to this problem is dealt with under the three headings of Capital Expenditure, Staff Requirements, Operating Costs.

STAFF REQUIREMENTS

How many personnel are necessary for the operation of Airport Recording equipment? The need will vary according to the system installed. Clearly, however, the ideal is reached when the equipment is so designed that it requires only the occasional services of an unskilled operator and yet will maintain continuous "listening watch" even more efficiently than the monitor staff which it replaces.

The development by the T.P. Group of the Thermionic Multi-Channel Airport Recorder now makes this possible for airports of all sizes. In addition to achieving the utmost economy in staff, this equipment further reduces operating costs to next to nothing in the following four ways. (1) The recording is on magnetic tape which can be used again and again after each recording has served its purpose. (2) From an initial four channels, extra channels up to a total of 14 can be added at small cost as requirements grow — all on the same tape. (3) The equipment is automatic and will give up to 12 hours continuous recording without attention. (4) Extreme simplicity of design ensures unfailing reliability.

Recordings can be played back repeatedly without loss in reproduction — but can be instantly erased on a separate demagnetiser, which can be kept under special supervision for security. The tape is then ready for immediate re-use.

Full details of this latest development in low-cost airport recording equipment will be supplied gladly on request.

Thermionic multi-channel airport recorder

Other products include the Soundmirror Magnetic Tape recorder, the Recordon Magnetic Dictating Machine and a complete range of instruments for electro-acoustical measurements.

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A Real Tarmac Tug

The David Brown Taskmaster is a real tarmac tug—easy to handle, with all-round driving vision, and turning like a taxi. It hauls all types of modern fighters and medium transport planes with either tricycle or conventional undercarriages. Check the features: eight good reasons why, with Taskmasters on the job, ground movement of aircraft, baggage handling and aircraft servicing is so much more simple and economical.

- ★ O.H.V. Engine developing 39 b.h.p.
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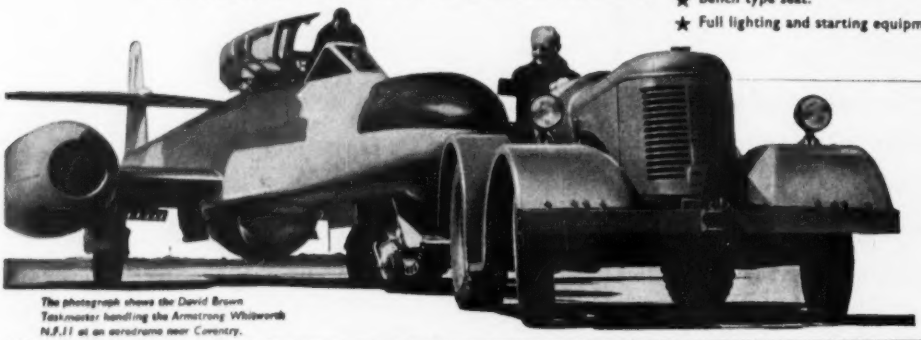

The photograph shows the David Brown Taskmaster handling the Armstrong Whitworth N.P.11 at an aerodrome near Coventry.

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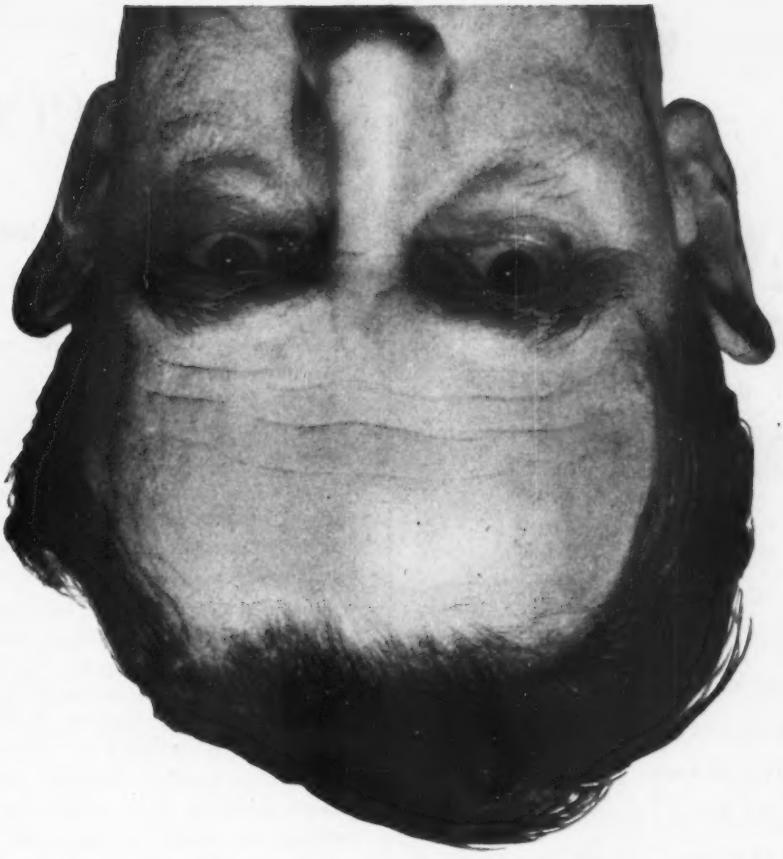

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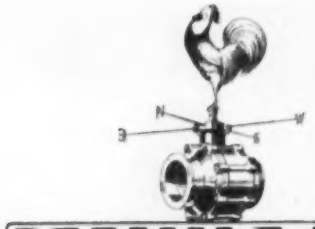

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Lockheed

SUPER CONSTELLATION DEMAND WORLD-WIDE

Unfilled orders for the Super Constellation now total more than $250,000,000, Robert E. Gross, president of Lockheed Aircraft Corporation disclosed in his annual report from California.

This high-speed luxury transport will mean more profit for the airlines that fly it. Designed to fly more payload farther and faster than any other aeroplane, the Super Constellation drastically cuts the cost per ton mile of both passenger travel and air cargo.

The Super Constellation, Mr. Gross reported to Lockheed stockholders, is the latest in a long series of advanced transports developed by Lockheed during the past 25 years. Examples : the Vega, which set 34 records in 1927 ; the Sirius, flown from the United States to the Orient in a record-breaking survey by Col. Charles A. Lindbergh ; the all-metal Electra, in 1934 ; the XC-35, world's first pressurized airplane, and winner of the Collier trophy (top U.S. aviation award) in 1937 ; the Hughes Model 14, which flew around the world in 3 days in 1938 ; the 263-mile-per-hour Lodestar, in 1939, fastest prewar transport in the world, and the first Constellation developed in 1945.

An all-cargo, trans-oceanic airline, Seaboard & Western Air Transport, Inc., recently ordered a fleet of Super Constellation cargo planes for long trans-Atlantic freight operations. Incorporating scores of exclusive freight-handling features, Seaboard & Western Constellations will cut per-ton-mile costs to less than 5 cents.

These Super Constellations will carry more than 36,000 pounds of freight on 2,000-mile non-stop trans-Atlantic flights, with a maximum speed of 375 miles an hour. Later conversion to turbo-prop engines would permit loaded speeds in excess of 400 miles an hour.

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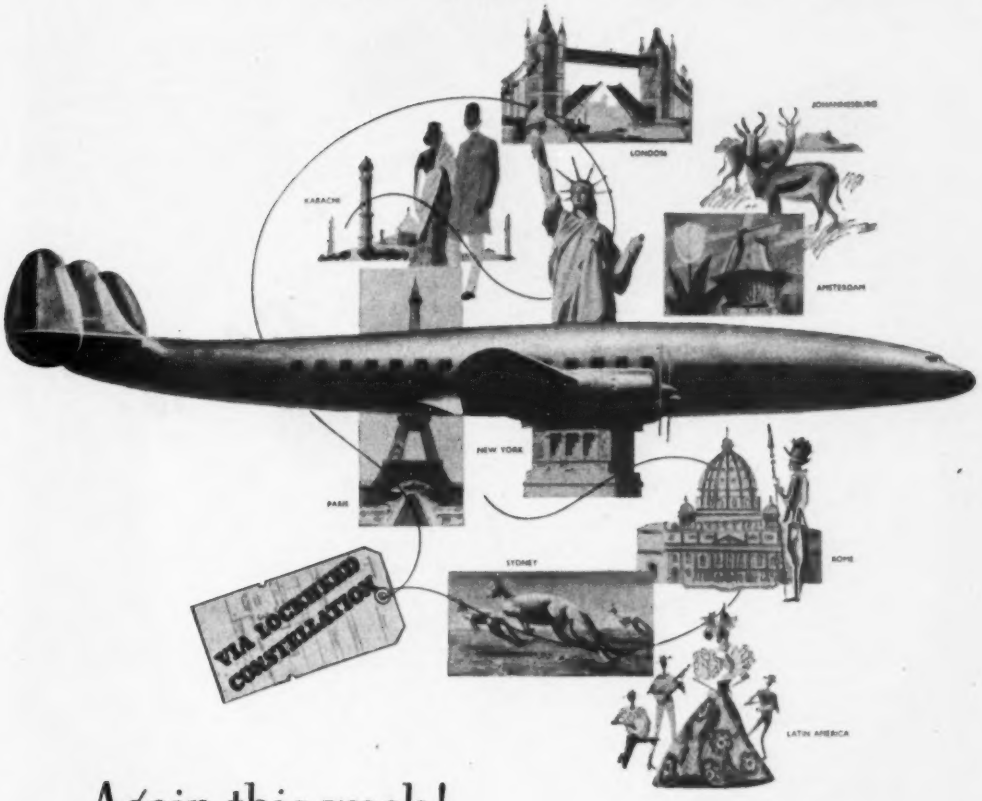

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And look for the big new Super Constellations now being produced for 11 leading airlines. Lockheed's Super Constellation is the finest air transport ever made, a natural expectation for an airliner built on the unmatched record of dependability of the famous Constellation.

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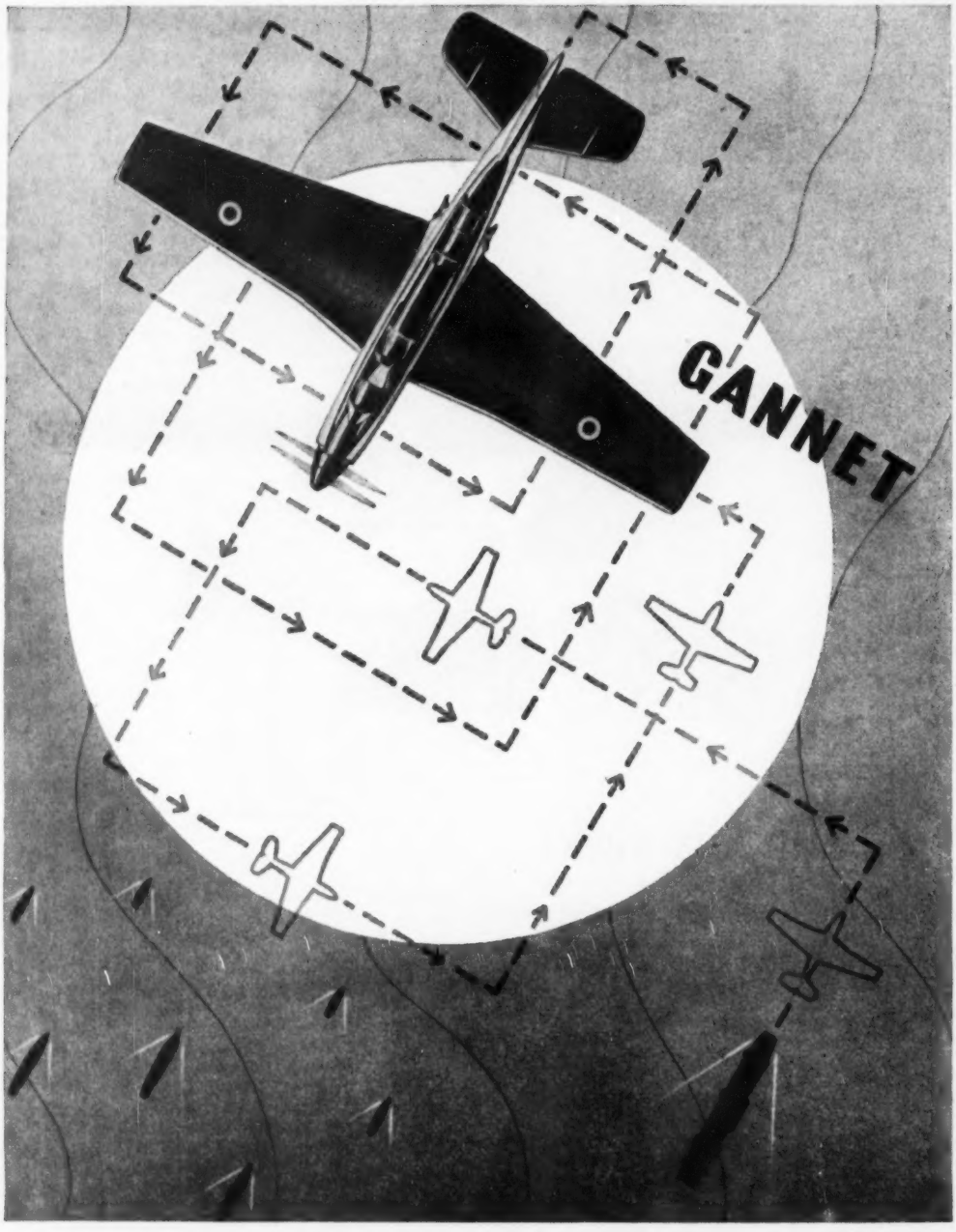

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First Aeronautical Weekly in the World

Founded 1909

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Striking a Balance

REGULAR readers will recall a series of articles in *Flight* last winter, in which we spoke of the great opportunity open to this country, through its aircraft industry, to enter the world's markets with turbojet and turboprop airliners—in particular, the D.H. Comet, Vickers Viscount and Bristol 175. Mr. Charles Gardner of the B.B.C. wrote two guest editorials in support of this theme, and on May 29th last the same vital subject was discussed on the air by a most distinguished "Taking Stock" team, who debated the question of the overall production demanded from the aircraft industry if the tremendous defence programme is to be realized. The speakers, under Charles Gardner's chairmanship, were Air Chief Marshal Sir Alec Coryton, Mr. George Edwards, Air Commodore Harvey, and Lord Pakenham. A brief report appeared last week.

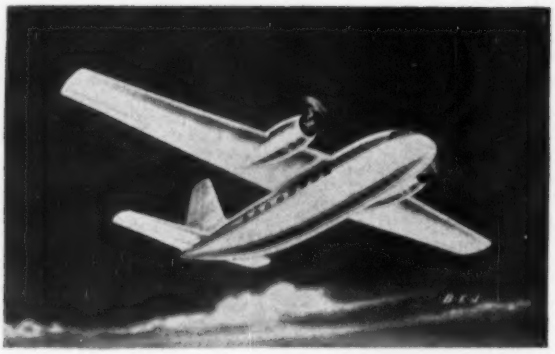
Since *Flight* first tackled the subject, too, certain facts have emerged more clearly. For example, the all-important requirement of more skilled men to produce aircraft, has started to be solved by taking the jobs to the men. Houses for workers in the aircraft industry are slowly being provided, but the main expansion in manpower will clearly result from extensive sub-contracting. Mr. George Edwards, in the B.B.C. discussion, said of the top-priority Valiant that more was being sub-contracted than for any other aeroplane within his knowledge in recent years. He was reasonably confident that the M.o.S. programme for this outstanding jet bomber would be met; and this was in addition to orders, totalling 54 to date, for the Viscount airliner, which it was planned to produce at the rate of four per month. Sir Alec Coryton, Bristol director, did not think the double military and civil production commitments impossible to meet.

There was one difference of opinion between these two speakers and the other members of the team, for while the former felt that this country's lead would be maintained for many years and at least into the next generation of civil aircraft, Lord Pakenham and A. Cdre. Harvey believed that the opportunity was to be regarded as a fleeting one to be seized at once; they detected a suggestion of complacency in the attitude of the other two. Mr. George Edwards had talked of a calm approach and instanced American production of 100 of one relatively small aircraft in a year as the maximum rate. Very high individual production-rates did not have to be reached, he said.

The discussion was in the main reasonably reassuring—both military and civil programmes stand a good chance of being met—but not, we think, wholly so. We agree with Lord Pakenham that everything should be done to seize the opportunity now, for while Sir Alec and Mr. Edwards are no doubt right in thinking that Britain will hold a lead in turbine-powered civil airliners for some years to come, competition will certainly increase and sales will become more difficult. There is no doubt that the promise of sure and early deliveries count for much when sales are being negotiated.

It also occurs to us that most of the discussion was dependent upon the assumption that there would be no deterioration in the international situation, but this unfortunately cannot be guaranteed. The team was apparently unanimous in the view that, if conditions demanded that something had to go by the board, then it should be one or more of the mediocre aircraft or, better still, the products of a less essential industry. Mr. Edwards will find plenty of support for his belief that certain vital key or bottleneck sections of the aircraft industry should be rationed to avoid inefficient use. He instanced skilled manpower in general (of which there must always be a hard core), and more particularly, tool design and manufacture.

There is much to be said in favour of Lord Pakenham's suggestion for a Cabinet committee to take top-level decisions to expedite important activities in the aircraft industry. Certainly we believe that more could be done, and done quicker, if the "normal channels" could on occasions be by-passed. He also tossed out another idea: with the Comet in mind—for which the manufacturers are already committed a good way ahead of orders—the real question was whether one could expect a private firm, even the most patriotic, to go past a certain point in risking its shareholders' money. Some form of Government underwriting might be offered to manufacturers and so provide a reasonable inducement to go ahead still faster than at present.



It will be gathered from this artist's impression that the Canadair CL 21 will be of utilitarian, though by no means pedestrian, appearance. The design has been prepared round Wright Cyclone single-row engines, but two-row Pratt and Whitneys and units of British design are being considered.

Preliminary Particulars of a 32,000-lb High-wing Passenger/Freighter

CANADAIR CL 21

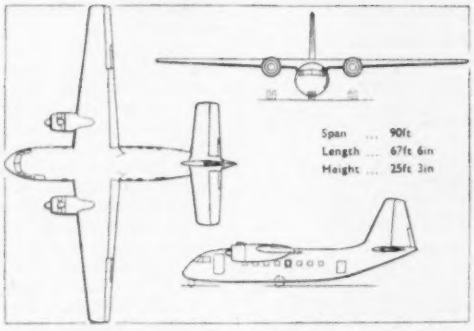
A WORLD-WIDE sales survey and market assessment are being conducted by Canadair, Ltd., of Montreal, in connection with an interesting civil project now in hand. Concurrently a full-size mock-up is being built and wind-tunnel tests initiated. Upon the outcome of these investigations, which should be complete this year, the decision regarding prototype construction will depend.

Designated Canadair CL 21, the projected machine has a gross weight of about 32,000 lb., will carry 32 passengers in addition to a crew of three, and will operate from a 3,500ft runway. The cruising speed is estimated at about 220 m.p.h. with a payload of 7,000 lb. Thus, the type should prove eminently suitable for operation over the short- and medium-range routes of the world.

The main specification was drawn up on the basis of that issued by the U.S. Air Transport Association for a local-service aircraft, which was approved by the Prototype Advisory Committee of the Civil Aeronautics Administration. Amendments and extensions have, however, been made to the specification in order to ensure the most economical use of the selected power plant and to widen the use of the machine to include countries other than America.

The basic design has been formed round two Wright Cyclone 9HE single-row nine-cylinder radial engines, delivering approximately 1,500 h.p. for take-off, but further studies are being made with a view to utilising Pratt and Whitney two-row engines or units of British origin. Reversible, constant speed, full-feathering airscrews will be standard.

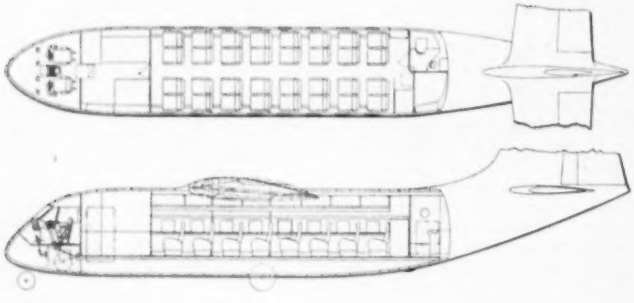
Features of the design include a cabin pressurizing system maintaining sea-level pressure up to 5,000ft and an 8,000ft cabin altitude at 15,000ft. The nosewheel undercarriage has dual wheels and large-capacity brakes. Obviously the high wing configuration not only affords an uninterrupted downward view for passengers, but permits convenient cargo loading at "truck bed" level.



It is calculated that the selling price at Canadair's Montreal factory should be about 450,000 dollars, and it is understood that a military version would be developed if sufficient interest were shown.

In overall dimensions the Canadair CL 21 is comparable with the DC-3, the span being 90ft, length 67ft 6in, and height 25ft 3in. The gross wing area is 900 sq ft, and double-slotted, N.A.C.A.-type flaps reduce the stalling speed—at "landing" setting—to 75 m.p.h. The gross take-off weight and gross landing weight are both quoted as 32,000 lb, and the C.A.R. take-off field length at sea-level (with automatic feathering) as 3,500ft. The C.A.R. landing field length at sea-level (no reverse thrust or flap retraction) is 3,300ft, and the C.A.R. "one-engine-out" ceiling is 12,500ft.

Canadair's interest in aircraft of this class may be said to date from their acquisition, during 1949, of the licence for the Northrop Raider, a three-engined high-wing machine with fixed undercarriage.



Interior arrangement of the CL 21. About 55 cu ft of cargo and baggage space is provided forward, and there is an auxiliary cargo space of some 50 cu ft aft. The crew comprises pilot and second pilot, radio operator or observer and attendant, the last-named being stationed at the rear of the cabin adjacent to a small buffet.

BANG GOES the BARRIER

The De Havilland 110 night and all-weather fighter prototype

NO one is more aware of the need for observing stringent security over many matters concerned with military aircraft than are the staff of *Flight*, but it is clear that, on occasions, in peace-time, voluntary censorship can be overdone. To come to the point, we have anxiously awaited an official statement on the "bangs" which have been heard over Hertfordshire recently, and which have formed a subject of discussion for thousands of people who heard them or read the reports in certain newspapers.

On Wednesday, June 4th, a perfect summer evening provided ideal conditions for very-high-speed flight testing, and vapour trails could be followed clearly in the sky. Between 6 and 7 p.m., the D.H.110 night and all-weather fighter was airborne from Hatfield, and during that period a loud bang in the sky was heard by many people, and windows and doors were shaken. According to the London *Daily Telegraph* "this heralded the appearance of the D.H.110 diving at great speed . . ."

In September, 1948, *Flight* was able to record the first known occasion upon which the speed of sound was achieved in this country—by John Derry, flying the de Havilland 108 research aircraft which had a specially rated D.H. Goblin turbojet. At that time we remarked that one of the most efficacious tonics administered to British aviation in recent years was the news that Mr. Derry had exceeded the speed of sound in a de Havilland research aircraft. This historic flight took place at 10 a.m. on Monday, September 6th, 1948.

Reports have been printed on more than one occasion of bangs being heard in California when American fighters, unseen by those on the ground, exceeded Mach 1 and in so doing caused windows to break below. These events were officially acknowledged, and subsequently several British, as well as many American, pilots have exceeded Mach 1 when flying, for example, various marks of North American Sabres.

It is our belief that the D.H.110, which has two Rolls-Royce Avon turbojets, has now been dived at a speed greater than that of sound, and we feel that many people will receive this information with gratification. If confirmed, it would again administer something of a national tonic after the depressing revelations to the general public of Russian Mig-15 performance over the Korean borders. We hope the de Havilland company will, in the near future, be permitted officially to confirm our belief or otherwise.

Speeds in excess of Mach 1 are usually achieved in a steep dive at heights between 40,000 and 20,000ft. Indicated airspeed is then between 450 and 500 m.p.h. The D.H.110, having very considerable thrust available, could probably exceed Mach 1 in a comparatively shallow dive. One reason for the good behaviour and controllability of the later marks of North American Sabre when flying at transonic speeds is the design of the all-moving tailplane, commonly referred to as a "flying tail." No details have been given of the between-boom horizontal surfaces of the 110, but close examination of the official photographs (and knowledge of current practice) would lead one to believe that this aircraft also has a variable-incidence tailplane.

So far as we know, no one has as yet advanced a precise explanation of the loud-bang phenomena which many people have now heard, but the area affected on the ground is believed to be of only one or two square miles, situated straight ahead and below the nose of the aircraft at a range of some four to five miles (20-25,000ft). Pilots have said that there is no sensation associated with the production of the bang, nor is it heard in the cockpit. It may be caused suddenly at the moment of achieving sonic speed, or it may be a progressively piled-up sound caused during the brief period of the sonic dive or, again, by the pull-out.

In the coming months we may expect such bangs to be heard in various parts of the country. It may be, however, that with greater thrust available from the latest axial turbojets, sonic speed will be achieved in level, or nearly level, flight, and, if so, the force of the "explosion" ahead of the aircraft will expend itself before reaching the ground; thus the public will know nothing of the remarkable exploits taking place in the sky far above them.

BRITANNIA PROTOTYPE NEARS COMPLETION

THAT the first flight of the Britannia prototype was due to take place shortly was stated by Sir William G. Verdon Smith, C.B.E. (chairman), in his address to Bristol shareholders at the annual general meeting, held on Thursday of last week. "We believe that no other aircraft has enjoyed so fully the co-operation of the constructor and the operator," said Sir William. "Largely as a result of our close and effective collaboration with B.O.A.C. on their order for 25 aircraft, the Britannia promises to be not only a notable step forward in aircraft engineering, but also the first aircraft truly capable of turning the dream of low cost air travel into reality."

Of Bristol helicopters, the chairman said that the Sycamore was in limited production and was being supplied to the Services both in the United Kingdom and in Australia. The larger twin-rotor Type 173, the world's first twin-engined helicopter, started its flight trials early this year, and development was proceeding. For the future they were looking ahead to a still larger size of helicopter, primarily intended to meet the requirements specified by British European Airways. Helicopters had today earned their place with the Services and with civil operators: recognition of their merit had now to be translated into production in quantity. Our American competitors were going ahead under the spur of military orders, and it was an urgent and difficult problem to reconcile the speedy development of this prospective new business with the present demands of the defence programme, but there was a potential world market of great importance which we in this country could not afford to miss.

Referring to a well-established Bristol product, the Freighter—orders for which have amounted to nearly 200—Sir William Verdon Smith told his audience that manufacturing capacity was being increased to meet the demand. These aircraft, conceived directly after the war as a private venture, had, indeed, justified original expectations.

Suspension of work on the second Brabazon, though a disappointment to those who believed in the future of big aircraft, could not be criticized in view of the need for economy in Government spending. Research and development were being continued with the first Brabazon, and invaluable data had been obtained.

Reviewing the work of the engine division, the chairman spoke of the Proteus 2 and 3 turboprops and then went on to say that development of the Olympus turbojet had gone ahead well during the year. The company had now accumulated a most satisfactory background of bench-testing which had given good grounds for confidence in the engine, to which they attached the highest importance; development of this entirely new design up to the flight stage had taken an unusually short time since the project was started, and they looked forward to having the engine in the air for the first time very soon.

A full report of Sir William G. Verdon Smith's review is given in the company's announcement elsewhere in this issue.

FROM ALL QUARTERS

A New C.A.S.

IMPORTANT changes in the high command of the Royal Air Force were announced last week-end. On January 1st next, Marshal of the Royal Air Force Sir John Slessor is to relinquish his post as Chief of the Air Staff and will be succeeded by Air Chief Marshal Sir William Dickson, who is at present the Air Council Member for Supply and Organization.

Air Chief Marshal Sir William F. Dickson, K.C.B., K.B.E., D.S.O., A.F.C.

A further statement from the Air Ministry announces the intention to transpose the titles of the Vice-Chief and Deputy Chief of the Air Staff, without any alteration in their duties. The purpose of this change is to bring the organization of the high command of the R.A.F. into line with that of the other two Services. Under the present arrangement, which came into effect in March, 1950, the Vice-Chief—Air Chief Marshal Sir Ralph Cochrane—has been concerned with problems affecting the strength and fighting efficiency of the Service, while the Deputy Chief—Air Chief Marshal Sir John Baker—has been concerned with inter-service policy, with planning, and with co-operation between the R.A.F. and Commonwealth and allied air forces.

Air Marshal Sir R. Ivelaw-Chapman, K.B.E., C.B., D.F.C., A.F.C.

Air Chief Marshal Sir John W. Baker, K.C.B., M.C., D.F.C.

Sir Ralph Cochrane is to retire on November 1st and will be succeeded by Air Marshal Sir Ronald Ivelaw-Chapman, with the title of Deputy Chief of the Air Staff. On the same day Sir John Baker, while retaining his present duties, will assume the title of Vice-Chief of the Air Staff.

The new C.A.S. is, like Sir John Slessor, an old Haileyburian. He is 53 and first served with the R.N.A.S. in the 1914-18 war.

The G.A.5 Ordered

NOT for many years—in fact, since the heroic days of Bulldog *v.* Hawfinch and Fury *v.* Firefly—has the outcome of an R.A.F. fighter competition been awaited with such interest as that occasioned by the Gloster G.A.5 *v.* D.H.110 duel, now concluded in Gloster's favour. And in offering that company our congratulations, we acknowledge de Havilland's brilliant achievement in the supersonic "110," referred to made on the previous page.

The decision was announced by the Air Minister, Lord De L'Isle and Dudley, in a speech at Cambridge last Saturday. He was replying to an article in the *Daily Herald* which remarked that the Air Ministry had not made up its mind about adopting a new night fighter, and he contrasted this "so-called indecision" with the action of the Labour Government in ordering the Canberra bomber and Hunter and Swift fighters off the drawing-board. The late Government's rearmament programme he went on to describe as "A well-intentioned but ill-digested scheme,"

SPEARHEAD: The Gloster G.A.5 (see below) in the ascendant.

and averred that when the present Government entered office it soon became clear how far the Socialist Government had allowed the Air Force to fall, in six years, from the high position it held at the close of the war. "It was then without equal in the quality of its equipment," he said, "yet in 1951 it had no fighter in service which could match the best Russian fighter." And, as readers of this journal well know, we still have no such fighter in use.

Lord De L'Isle and Dudley added, "It is fair to say that the process of re-equipping the Air Force was started by our predecessors; but the race to maintain technical superiority in the air is fierce. If you fall behind, it is difficult to catch up. The Prime Minister's directive, giving super-priority to the most modern types of aircraft, has focused attention on the need."

The Air Minister acknowledged that it was just as well that orders off the drawing-board had been placed for certain types of aircraft; otherwise our present position would have been even worse. "But let us be quite clear," he added, "that it is not a desirable thing to order complicated and expensive aircraft before they have even flown." He went on, "In the case of the new night fighter, we have been able to evaluate carefully the qualities of the two types of aircraft which were commissioned by the Labour Government and first flew in the autumn of last year. The procedure we have followed for this fighter—which is vital for the effective air defence of this country—is a far better one than to order hastily off the drawing-board because events have outstripped policy."

Commenting on the order for the Gloster G.A.5, Sir Frank Spriggs, managing director of the Hawker Siddeley Group, said, "There has been considerable speculation for months in the aircraft industry—both British and American—as to which aircraft would be selected for the vital European atom-defence role." He remarked that the G.A.5 was the first delta to be placed in production anywhere and that it confirmed the faith of his Group that this "new and evolutionary triangular wing form" was the shape of the future. "We are sure this will be the first of many deltas," he added.

Mr. Percy Crabbe, managing director of the Gloster Aircraft Co., Ltd., expressed himself as follows: "Our thousands of workpeople here in Gloucester, beginning with designers George Carter and Dick Walker, right to the sergeant at the gate, are very proud indeed."

All performance data are, of course, restricted, and are likely to remain so for a year or two to come; but we have the word of S/L. W. A. Waterton, A.F.C. and Bar, who made the first flight and has been responsible for most of the development flying, that the most ordinary things about the G.A.5 are its flying and

handling characteristics, which "vary but little from those of any conventional old-type, plank-wing aircraft." He goes on, "The machine is designed for all-weather day and night operations, and so, in order to carry the large amounts of equipment to fulfil this role, is relatively large and heavy. Despite its bulk, however, it has a climb and speed equal, or superior, to current plank and swept-wing single-seaters, and—thanks to its very low wing loadings (which also endow it with very modest take-off and landing speeds)—a very high degree of manœuvrability at low A.S.I.s at low and high altitudes."

It may be surmized that by the use of flaps (these are visible for the first time in the newly-released photograph herewith), landing incidence should be kept low. In fact, S/L. Waterton reports that throughout the approach and landing forward visibility is excellent, and the airfield and runway can easily be seen right up to, and during, the touch-down. "The G.A.5 has proven relatively viceless," he says, "with excellent stall warning and no real peculiarities, and displays the more endearing characteristics of the Anson. It is, however, by virtue of its very high power/weight ratio and low wing loading, an extremely lively and potent aircraft, with terrific acceleration."

S/L. Waterton adds that at low and high altitudes, speeds and Mach numbers, the Armstrong Siddeley Sapphires have proven equal in all respects—and superior in many—to any axial or centrifugal units within his experience.

"Happy Returns" to Her Majesty

COASTAL COMMAND sent eighteen new Avro Shackletons to London on June 5th for the ceremonial fly-past in honour of the Queen's birthday. Their arrival over the city centre, just before 1300 hr, was heralded by the low-pitched roar of 72 Rolls-Royce Griffons—an impressive sound, matching the splendid sight of 18 gleaming white aircraft spread out in three flights of six. Despite slipstream and thermal turbulence, station-keeping was excellent during the run-in to Buckingham Palace; then, having saluted the Sovereign on behalf of the R.A.F., the Shackletons turned away to the south-west and headed for St. Eval.

A member of the staff of *Flight* was privileged to accompany the formation and so obtain a close-up view of the sustained effort made by the crews.

Taking off individually from St. Eval, Cornwall, the Shackletons—18 MR.1s—flew south-east to the Channel off the Fowey-Mevagissey area, where formation was joined under the command of S/L. A. E. W. Laband. Course was then set for Luton, some 210 miles to the north-east. It was apparent that the trip would be rather a strain, there being much low cloud and haze to make conditions oppressive; in fact diversions had to be made round the hills of Devon.

From Luton, the formation flew to Clacton, which was reached at about noon; here, some holding was necessary to enable the run-in to London to start on schedule. At the appropriate time, the Shackletons turned on to 250 deg and gradually closed formation as London was neared. At Brentwood the Roman road from Colchester appeared, forming a useful guide across Romford and Ilford. At 1,000ft over the City conditions were difficult; station keeping was obviously hard work, but a gentle turn to port brought the formation into line with the The Mall—which runs at about 235 deg—and over the Palace exactly at 1300 hr.

From each aircraft anything up to ten pairs of eyes peered at the Royal balcony for an instant; then, with a noticeable easing of the tension, the Shackletons were pointed south across Kingston-on-Thames and the formation opened out slightly. Reaching the Channel once more at Rye, Sussex, the homeward route roughly followed the coast, diversions to seaward being made past the major towns. St. Eval was reached at about 1500 hr; the crews felt rather tired by now, and very deafened—but proud that they had represented their Service in its salute to Her Majesty.

Prior to "the day" much practice flying had been done off the Cornish coast. Formation flying, especially with 18 aircraft, is far from an everyday job for Coastal Command and the polished formation seen over London reflects credit on all concerned.

The S.14 at Home

FOKKER'S Derwent-powered S.14 side-by-side jet trainer has now been inspected by several foreign missions and interest is said to be on the increase. This is due, no doubt, not only to the manifold qualities of the machine itself, but to the showmanship of Maior Gerben Sonderman, the company's chief test pilot. Major Sonderman has recently numbered among his distinguished "pupils" in the S.14 H.R.H. Prince Bernhard of the Nertherlands—the occasion being a display at the Leeuwarden fighter base.

Air Marshal Sir John Boothman, our own Controller of Supplies (Air), is reported to have "seemed very pleased" after trying the S.14 for himself, and equal enthusiasm is said to have been shown by Maj.-Gen. Craigie, U.S.A.F. It is understood that, as the outcome of Sir John's visit, the S.14 will be sent to Boscombe Down for official trials.

LONG-LEGGITY BEASTIE: In its corral at Culver City, California, stands the Hughes XH-17 jet-powered, weight-lifting helicopter, now ready for trial after many vicissitudes. It is said to be the world's largest rotating-wing aircraft (the description is particularly apt in this instance), though the same distinction is also claimed for the new Piasecki XH-16. Slung from the chassis are water-ballast tanks.

A.V-M. David Atcherley

AT the time of going to press, hopes of any good news of A.V-M. D. F. W. Atcherley, C.B., C.B.E., D.S.O., D.F.C., A.O.C. No. 205 Group, are increasingly slender. He was reported missing at 0730hr G.M.T. (0930 local time) last Saturday during a flight in a P.R.10 Meteor from Fayid, Canal Zone, to Nicosia, Cyprus.

A.V-M. D. F. W. Atcherley.

An intensive search by Canal Zone aircraft—including Valettas, Beaufighters, Meteors, Vampires, Lincolns, Ansons and Devons—was immediately laid on, while U.S.A.F., Israeli and Turkish aircraft joined in, and airliner captains were requested to keep a keen lookout for a dinghy or any other evidence. The sweep of the Eastern Mediterranean continued throughout the hours of daylight and was renewed at first light on Sunday; it was eventually abandoned on Sunday evening.

David Atcherley is, of course, one of the famous "Atcherley twins," whose R.A.F. careers have been in many ways unique. He was born on January 12th, 1904, at Fulford, near York, and was educated at Oundle, and at the Royal Military College, Sandhurst, from which he was commissioned in the East Lancashire Regiment in 1924. He was seconded in 1927 to the Royal Air Force, in which he was given a permanent commission in 1929 and posted to the C.F.S. He was an instructor at the R.A.F. College, Cranwell, from 1929 to 1931, and during the next four years served with Nos. 20 and 28 Squadrons in India. He was at the R.A.F. Staff College in 1936-37, and on the staff of No. 16 Group, Coastal Command, during 1937-38.

At the outbreak of war he went to France in command of No. 85 Squadron's Hurricanes and afterwards served at R.A.F. H.Q. in France. After returning to the United Kingdom in 1940, he commanded the R.A.F. Station at Castletown, and in the following year commanded No. 25 night fighter squadron. Later he was Station Commander at Castletown and Fairwood Common.

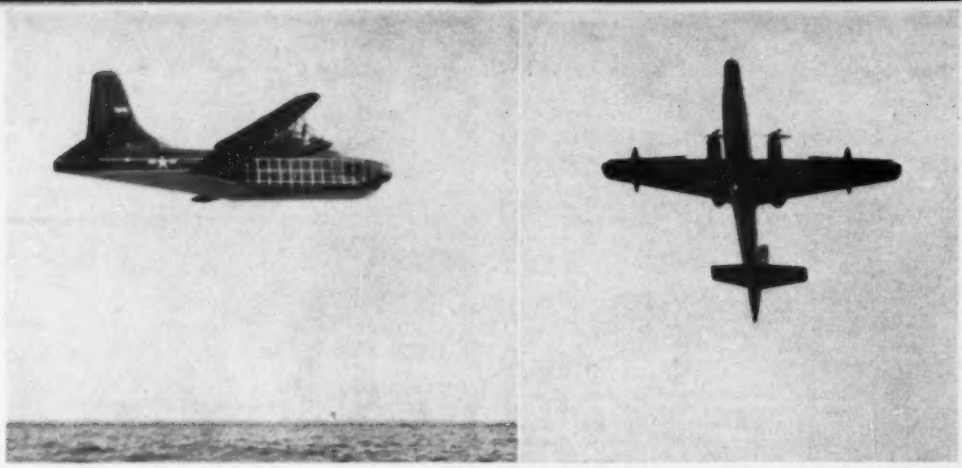
In 1942-43 he commanded No. 325 Night Fighter Wing in the North African campaign, and afterwards became S.A.S.O. of No. 2 Group, 2nd T.A.F., which operated in Europe until the end of the war, and with which he stayed until his appointment as A.O.C., No. 48 Group, Transport Command, in December, 1945.

He afterwards commanded No. 47 Group, Transport Command, for some months before going to the Air Ministry in October, 1946, as Director of Air Support and Transport Operations, a post which he held until he went to Central Fighter Establishment, as Commandant, in March 1948. In January 1950 he was appointed S.A.S.O., Fighter Command H.Q., and his Middle East appointment came in January last.

In all his senior posts, A.V-M. Atcherley has consistently kept up his personal flying, first in Spitfires and subsequently in Meteors.

Supermarine 508 Adopted?

THE Admiralty announce that the "production model" of the Supermarine 508 twin-Avon carrier-borne intercepter will be "an even better version" of the present prototype, which has made its initial deck-landing trials aboard H.M.S. *Eagle*.



THIRD GENERATION: The wings and hull "crown section" of this modern-looking Martin experimental flying boat were originally those of a wartime Mariner. Next they were fitted to the XPSM-1 (at present in production as the Marlin) and now they appear on this "M-270," with a hull 12ft longer than that of the XPSM-1 and having a 15:1 length/beam ratio. The white lines correspond to those on a tank-test model and serve to check the tank results. Note the leading-edge slots.

HERE AND THERE

Source of Supply

U.S.A.F. European H.Q. at Wiesbaden signed a multi-million-dollar contract last Friday for the manufacture of jet-aircraft spares by the Italian aircraft industry.

Any Old Shooting-Irons?

AMERICAN representatives arrived in Sydney last week to buy derelict U.S. aircraft from the R.A.A.F. It is stated that they are particularly interested in the armament, which they will send back to the States—presumably for use in training.

Multi-lingual

A SECOND French edition of the *Flight* book *Gas Turbines and Jet Propulsion* has been published by Dunod of Paris. This standard work has also appeared in Dutch, Italian and Spanish, and in a special American edition.

German Research Again

A REPORT from Bonn states that the German Air Research Institute has taken up its work again at a former *Luftwaffe* airfield near Essen. The names of Professor Schmidt and Professor Esau are mentioned in this connection, and it is further reported that the research in hand has so far been confined to paper work.

S.N.E.C.M.A.'s New Turbojet

MENTION has previously been made of the existence of a new S.N.E.C.M.A. turbojet design of unstated thrust, and a guarded announcement now follows indicating that the "realization of the prototype" has been unusually quick. Serious development work did not begin until early in 1951, yet the first unit was being run-in on the bench at the end of last month. The name given to this new power unit is the Vulcain.

Aids to Industrial Safety

SPEAKING at the opening of the Mechanical Handling Exhibition and Convention at Olympia last week, Sir Walter Monckton, Minister of Labour and National Service, said that more than 53,000 accidents a year in factories occurred during the handling of goods and materials; many of them were due to things being dropped or allowed to slip from the hands and could have been avoided by the greater use of mechanical aids. The exhibition at Olympia—organized by *Mechanical Handling*—ends tomorrow evening, June 14th.

Two Air Displays "Off"

THE usual "air day" at R.N. Air Station, Stretton, near Warrington, cannot be held this year because of an extensive runway-construction programme. Another cancelled event—this time one for which a date had been fixed—is the Fair Oaks Flying Club's "at home" and display, which was to have taken place tomorrow, June 14th.

Past and Future

"FOR close defence the guided missile is the thing, but if you have to go into enemy territory I think you will always have to have piloted aircraft," said Air Chief Marshal Sir Philip Joubert in a speech in London last week. He foresaw the night and day fighter of the future as a large aircraft equipped with a battery of guided missiles which it would discharge at the enemy after sighting it on a radar screen. Sir Philip was speaking at the banquet of the Worshipful Company of Loriners, one of the ancient City livery companies.

A Factor Named Joe

SOME unusually interesting aspects of airliner operation were discussed during the recent I.A.T.A. technical conference in Copenhagen. Though concerned primarily with approach and landing aids, the discussions were not by any means confined to the various systems themselves. Both pilot-psychology and aircraft design were the subject of critical and well-informed opinion. It was pointed out, for instance, that approach procedures and devices should be designed to suit a notional pilot named Joe—"a creature of habit and instinct"—rather than some superman of outstanding ability. Aircraft stability during power-changes was important, as were good stalling characteristics during flare-out, while flaps should be designed to retract quickly, during an overshoot, to the approach or climb setting, and more slowly thereafter. We commend these I.A.T.A. views—summarized on pages 718-719—to designers.

Aerodynamic Charivari

"WE ought to begin with balloons, which overcome gravity by easy stages, pouring sand on it whenever it seems to be getting the better of them"—from an introduction to aerodynamics by "Mr. Punch," whose Summer Number contains an aviation supplement on which his contributors deserve congratulation.

CONFIDENTIAL, like that of its full-scale prototype, is the performance of this jet-propelled flying model of the Hawker Hunter, the work of Mr. D. M. Dent. The power unit is one of the new Jetmasters produced by Wilmot, Mansour and Co., Ltd., of Totton, Southampton, and the only departures from the full-scale airframe design are the provision of dihedral on the mainplanes and the scaling-up of the tail surfaces.

The last of the Ansons

The prototype Anson was flown for the first time on March 24th, 1935, and the last Anson was delivered on May 27th, 1952. In those 17 years, 11,020 Ansons have been built, and have won fame, honour and affection in a multitude of jobs the world around. Now, as the Anson, a great design of the past, goes into history, the design of the future is found in the AVRO Delta, the new planform which carries on Avro's traditional leadership and pioneering, promising higher speeds, greater range and maximum economy of operation in the age of "Jettery."

ANSON SPARES will continue in production and will be available as long as Anson users require them.

AVRO

The first of the Deltas

A. V. ROE & CO. LIMITED / Manchester

MEMBER OF THE HAWKER SIDDELEY GROUP / PIONEER . . . AND WORLD LEADER IN AVIATION

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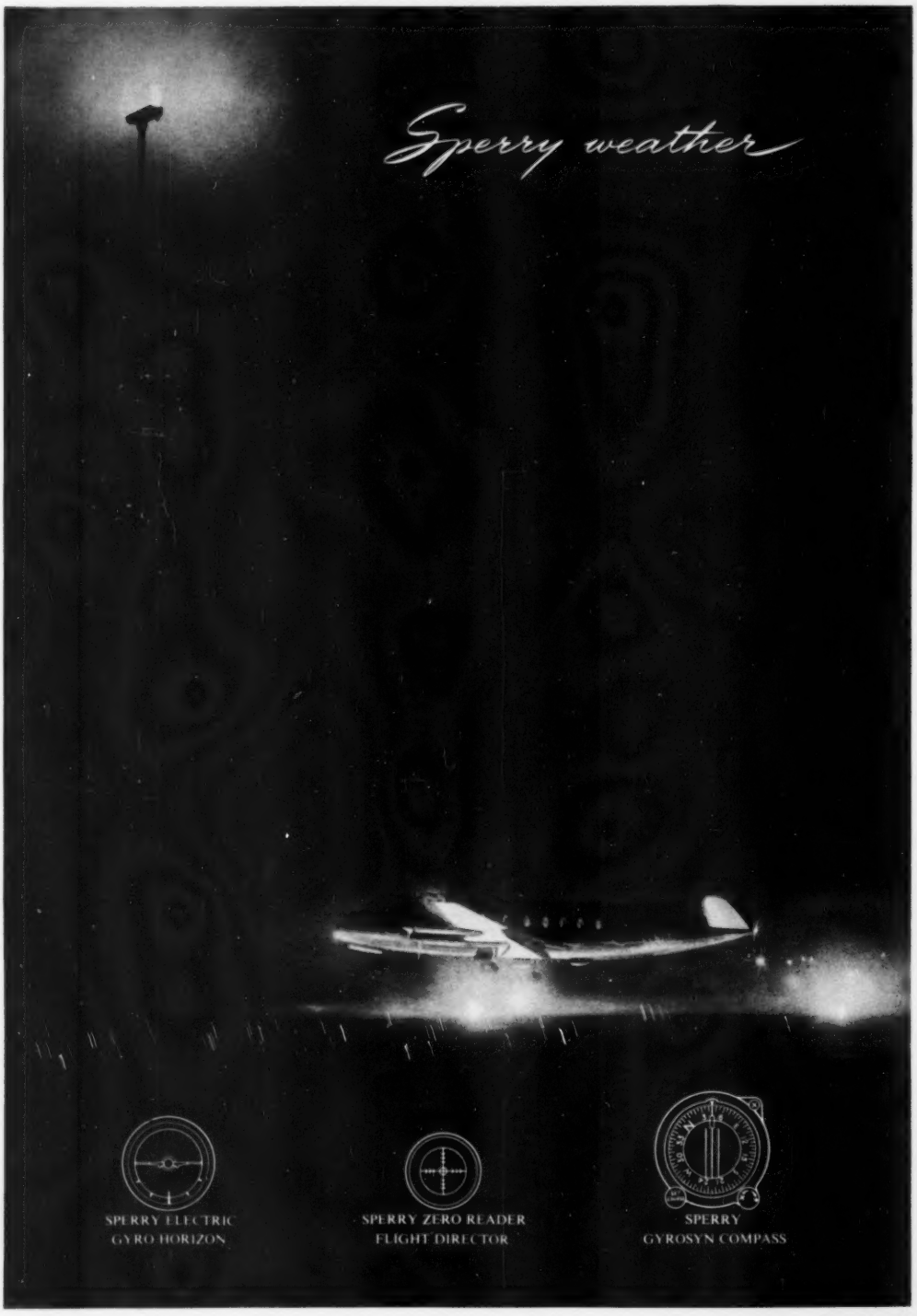

Sperry weather
SPERRY ELECTRIC
GYRO-HORIZON
SPERRY ZERO READER
FLIGHT DIRECTOR
SPERRY
GYROSYN COMPASS

HERE AND THERE . . .

New De-icer

RUBBER leading-edge de-icers, almost universally employed on American aircraft, may be superseded by an electric resistance de-icing boot developed by the Lockheed Aircraft Corporation. This smoother metal shoe can absorb a current density of up to 75 watts/sq in; flight testing is being carried out with a Lockheed F-94 fighter.

A Minister at Derby

DURING a visit last week to the Derby factories of Rolls-Royce, Ltd., Mr. Duncan Sandys, the Minister of Supply, allowed his enthusiasm for what he had seen to lead him into stating, pithily if a little indelicately, that Rolls-Royce has been, and still remained, "the guts of Britain's air power." He went on to observe that this country had established a remarkable lead in the air, largely as a result of Rolls-Royce work; we were years ahead in the air, and it was not just a "paper" lead. If we could once establish British aircraft on the civil airlines of the world, then they would remain. It was a critical period, added Mr. Sandys, for we had an opportunity which was unlikely ever to occur again.

SECRETS OF THRUST: Lord Hives (left), chairman of Rolls-Royce, Ltd., explains to Mr. Duncan Sandys the niceties of turbine-blade design, watched by Mr. J. G. Brown, north-west regional controller, M.o.S., and by Mr. J. D. Pearson (right), a director of the company and general manager of the Aircraft Division. (See paragraph, "A Minister at Derby," on this page.)

IN BRIEF

At a meeting of some 70 users and manufacturers of mechanical handling equipment, it was decided to form an Institute of Material Handling. Details are obtainable from the secretary, Mr. M. W. Painter, A.C.C.S., 20-21, Took's Court, Cursitor Street, London, E.C.4.

* * *

Well known in the aircraft industry, Mr. Mervyn Cutler, A.F.R.Ae.S., has rejoined Armstrong Siddeley Motors, Ltd., from the Nuffield Organization, and has been appointed technical manager, cars.

* * *

At the recent annual general meeting of International Aeradio, Ltd., Sir Victor H. Tait (chairman) said that the company's aircraft radio and other facilities had been provided at 50 stations in 32 overseas administrations; they were now being used by 203 civil operators, and also by numerous air forces.

* * *

Ninety-six pages of light-hearted reading matter by 40 top-line writers and illustrators go to make up *Summer Pie*, now on sale (1s 6d, at bookstalls) to aid the funds of the Advertising Benevolent Society.

* * *

A comprehensive catalogue lately issued by Desoutter Brothers, Ltd., gives some measure of the immense variety and versatility of the company's portable pneumatic tools. Specially featured is the new SR.50 pneumatic motor, referred to in our recent British Industries Fair report.

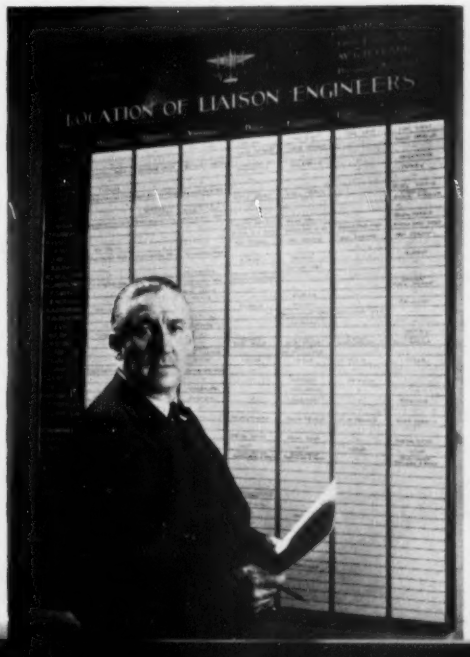
* * *

"Better by half—half the size, one-third the weight" is the theme of a brochure, lately issued by Venner Accumulators, Ltd., New Malden, Surrey, which sets out the characteristics of the company's range of lightweight alkaline accumulators.

* * *

The Gas Welding of Aluminium (No. 5 of the series of A.D.A. Information Bulletins) is a 68-page booklet treating its subject—which includes aluminium alloys—most comprehensively; it is published at 2s by the Aluminium Development Association, 33, Grosvenor Street, London, W.1.

CONTRIBUTORS TO SUCCESS: THREE MORE "MEN BEHIND THE COMET"



In our special number (April 25th), marking the entry of Comets into scheduled service, we devoted two pages to portraits of the personalities concerned with the production, testing and proving of these remarkable aircraft. Since then, it has been possible to obtain photographs of three more members of the de Havilland team. On the left is seen Mr. A. J. Brant, service manager, whose engineers have already played a valuable part in B.O.A.C.'s introduction of the aircraft into service. Below, on the right of a group with G/C. John Cunningham, is Mr. C. G. Long, chief development and purchasing engineer, responsible for choosing and developing materials. Right is Mr. R. T. Harper, chief structural engineer, who decides on strength and weight requirements.

SINGLE-ENGINE SAFARI

From Paris to Central Africa and Back in a Four Seater: Part I—the Outward Trip

By LORENZO A. de MORELOS

IN this entertainingly phrased article, the French owner of an American light aircraft, a Ryan Navion (185 h.p. Continental), describes a trip which he and a friend made last June from Paris to the Belgian Congo; incidents on their return trip will be recounted in a second instalment. Both are pilots (and navigators) of comparatively modest experience, but their approach to the problems of single-engined flying over remote tropical areas seems, in general, to reflect a well-balanced appreciation of the risks that can so easily arise during ventures of this kind. The Navion's equipment consisted of full blind-flying panel, Lear A.D.F. and A.R.C. ten-channel V.H.F., and H.F.

OUR good friend the distributor of Navions for France gave us a "going away" cocktail party. Cracks came thick and heavy about the bold and courageous navigators, the foolhardy aviators, who were flying gaily off towards an unenviable last rest 'midst the crocodiles of the upper or lower reaches of the Nile. The belly of the little crate, they said, would be more or less happily posed on the steaming bosom of an inhospitable jungle after the 185th horse of its valiant motor had coughed its last.

We had fixed our departure for two days later, but had stealthily announced it for the next day, thus saving an entire day for the too many errands traditionally left to the last minute. This scheme was far too successful, and our smugness at being left in peace turned to utter loneliness by the time we finally got away the next Sunday. By the Thursday night, when we sheepishly admitted we were still in Paris, we found out just how fleeting glory can be. Our meteorologically unenlightened pals, tears of farewell thoroughly dried, changed their good-natured cracks to undisguised boredom with the whole project.

On Tuesday evening the weather bureau at Toussus predicted a rapid deterioration from extremely favourable conditions. At seven on Wednesday morning, a severe QBI was in force and a deepening depression had spread on the north and the centre of France.

Neither of us was what you would call experienced pilots. Laurent Rombaldi, an art-book publisher, had logged about 150 hours; my total was little more than double, so still to be sneezed at.* At least we knew our limits. Although the Navion was equipped with V.H.F./H.F. receiver and a radio-compass, elementary wisdom cautioned us not to make an I.F.R. flight-plan and leave with a ceiling offering no margin of security.

For days the aircraft had been ready to leave, completely checked, oil changed and gas tanks filled; tools were in place, with a few spare parts. Our passports had long since been visa-ed by all the appropriate consulates.

The weather bureau finally came up with better answers on the Sunday morning and we grabbed our bags, presents for friends in the Congo, parachutes, Mae Wests and guns. Throwing everything into the car along with our most faithful supporters, we patted the family dog, who wore the distinctive look of one who expected to see us back within the hour.

Our take-off weight amounted to within six pounds of the maximum permissible for the type. The loading problem was enough to please an experimental psychologist; by the time the last round duffle-bag was fitted into the last square corner, it had taken us an hour. With stuff up to the roof and the two of us seated at the controls, the nosewheel barely touched the ground, as duly noted by our camera-happy well-wishers.

Then, after a quick lunch, another visit to the duty forecaster, to the control tower and touching good-byes, we were rolling on the runway . . . and went right on rolling. With the weight we were carrying we reached the three-quarter mark before we could pull off. If this happens at 390ft, we wondered, what'll it be at an equatorial 6,000?

"Fox Sugar Roger, airborne at 1312."

The weather, though improved, still was not too clear. At 1,000ft, with visibility continually reduced by heavy showers, we flew around thunderstorms. Happily, the ceiling lifted a little as we approached the relief and, carefully choosing corridors, we arrived over Saint Etienne without having lost sight of the ground. Knowing that the weather over Southern France was clear, we passed to instruments and, jaws set, upper lips stiff, we pushed nto the overcast to climb to 7,500, A.D.F. tuned on the Montelimar beacon, in order to clear the last summits of the Cevennes.

Suddenly, under an immaculate sky, the Rhône valley appeared and a fair mistral carried our ground speed to 145 knots. The serene Provence unfolded under our wings while isolated cumulo-nimbus were beginning to disperse in that late afternoon over the Luberon and the Alps on our left. Four hours and five minutes after having taken off from Toussus, we sat down in Cannes. We still had time to take a swim in the almost fantastic blue at Eden Roc that the cocktail hour had left pleasantly private. After dinner we took a walk around the harbour and talked about the Africa we would challenge the next day.

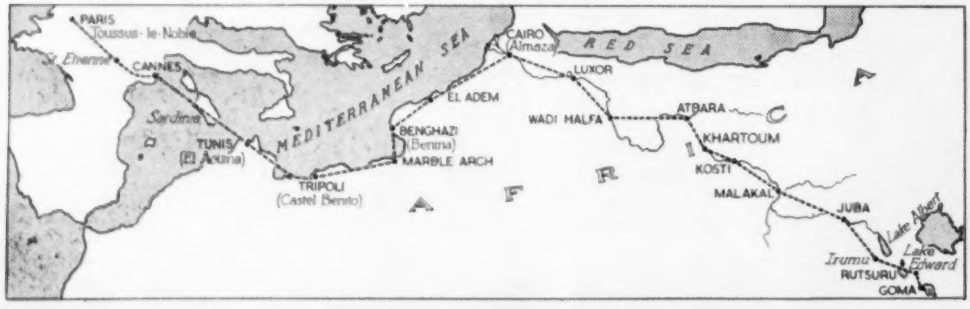
By 0900 we were ready to leave. This time we had to add to the usual pre-flight checks and consultations the police and Customs formalities and the strapping on of our Mae Wests. Still heavily, we took off, and then climbed on instruments in a shimmering haze of fine weather which dissolved the Mediterranean horizon except for the still snow-covered mountains of Corsica, which we skirted at a distance, having set course on Sardinia. The whole time we were in R/T. communication with the "Cassis" fixers, then the "Corsos." The wind again was with us and, as soon as we passed Sardinia, we could talk with Tunisia, from our flying height of 9,500ft. The African coast came into focus—Bizerte, Tunis—and we landed at El Aouina Airport after a flight of 3 hours 40 minutes. Our only mistake thus far seemed to have been in wearing shorts; our thighs were thoroughly sunburned.

Thanks to capable and obliging personnel, all formalities at El Aouina are rapidly concluded and lose their almost universally tedious aspects. After a short stroll through the Arab town, we hurried back to the hotel, our maps, protractors, parallel rules, computors and plotting charts, and prepared our navigation for the following days. With the kind help of the Aero Club of Tunisia, we could in one morning visit the authorities for final instructions regarding flights over areas of unpatrolled desert. This led us to pyrotechnists, grocers and pharmacists respectively, to gather flares, cans and first-aid kits which, with a five-gallon canteen of drinking water, had to be added to our load, according to regulations.

From then on we wore nothing but light and loose flying suits, which proved to be the best outfits for flights in warm countries.

At 1,500ft we flew at a low altitude over ancient Carthage, cut across to the coast of Gulf of Gabes and followed it at such

The route taken by the Navion on the outward flight across France and the Mediterranean, along the North African coast, and down to the Congo.



* *Shortly after this trip, the author (who had done about 350 hours' flying before it) went to England to widen his academic, technical and practical knowledge; he is now the holder of a Commercial Pilot's Licence with Instrument Rating.*

(Above) A cloudscape over Alexandria. (Top, left) The Nile in the desert near Cairo. (Left) The Navion arouses native interest at a later stage in the trip.

a distance as to be able to glide to land in the eventuality of a breakdown. Tripoli and its gardens were 7/8ths overcast with cumulus. We passed under the layer to find the base at only 600ft; it was hot and extremely bumpy.

We wanted to land at Wheelus, which is close to the city, but this field was reserved for the U.S.A.F. as a Shooting Star base and we were directed by QDM to Castel Benito, an airport controlled by the R.A.F., as were all the airfields in Libya and as far as Egypt.

Tripolitania was at that time still under U.N. trusteeship, with Great Britain as overseer. Flying control being in the hands of the British, everything went smoothly—until we were presented with the bill for landing fees, which were to be paid in "M.A.L.," the only currency in use, while money exchange was practically unknown. Eventually, we thought we had worked out an arrangement, but at this writing we are still in correspondence over the matter. Furthermore, the Arab Customs officials speak an incredible mixture of Arabic, Italian and English, which didn't simplify things.

We were billeted at the R.A.F. camp. They fed us, too: preserved eggs, one apiece; slices of Spam, one apiece; and chips fried in what seemed to be freshly drained crankcase oil. Breakfast: ditto.

Back at the field by motor cycle before dawn, we changed the oil of the aircraft by flashlight. By the time we took off, the air was already torrid and turbulent, but the cumulus layer of yesterday was down to 5/8ths. We passed over it, but were able to keep in sight of the Rommel Road, to which we wanted to stick faithfully nearly to Alexandria. The immense uselessness of the Libyan desert is strewn with ancient and modern left-overs of man and nature. The only airfields to be found are along the Rommel Road, although most of them are completely abandoned; furthermore, a pilot's only chance of being found is to have his accident near enough the road to be spotted by the bi-weekly truck that passes over it. A forced landing far from the road would make the job of the R.A.F. search and rescue very difficult.

We had to land in a 30 kt cross-wind at Marble Arch—only refuelling station between Tripoli and Bengazi—among the mounds of sand on the asphalt of the runway. Around the arch of triumph, under which goes the road and on which the Duce in *bas relief* points his finger toward Alexandria, three Arabs and a donkey dwelt in a heap of junk. All four brought us the gasoline we needed.

Apparently the R.A.F. cook at Tripoli had flown our lunch on ahead of us. In Bengazi-Benina we downed the eggs, the Spam and the chips with courage befitting cross-desert adventurers.

Scarcely 45 minutes out, I noticed the fuel gauge to be indicating the main tank as half empty. There was no mystery about it; the cap was dangling in space by its chain and air suction was syphoning out the fuel greedily. Laurent made a heroic but futile effort to reach and rescrew the cap, but to succeed we'd had to open the cockpit dangerously wide. Turning 180 degrees we headed back to Benina, replaced the lost fuel and made doubly sure the cap was on tight. Up again, our plan of sleeping in Alexandria that night was two hours out of the question. We had solemnly ruled out night flying for the obvious reason that the most adequate emergency-landing field cannot easily be found in the dark: and with only one engine you never can tell when you might need one.

At dusk we were flying over the ship graveyard of Tobruk, which itself consists of six or seven hovels and not so much as a drop of fresh water. The wind over El Adem, isolated airfield in the heart of the desert, was sand-filled and we landed with minimum visibility.

It was an R.A.F. dinner; enough said. If we have something less than admiration for R.A.F. cooking, we have the highest respect for the rest of the outfit. Take this as an example. We were due for a 30-hour check on arrival, and a mechanic there offered to do the job despite the fact that none of the special Navion tools was available. It took him not less than five hours to dismantle the oil and gas filters but he did everything with aimiable willingness.

To bed at one and up at four; our nap was not only short, but glacially cold. Breakfast was as expected, and we got off at dawn. As soon as the sun was up it was exactly as if a switch had been turned from cold to hot; it was suffocating even at 7,500ft.

The Nile delta approach to Cairo was a green and refreshing surprise to the eyes after the days we had spent over desert. We came down under enormous cumulus. The inside of the cabin was like a steam bath. It was so bumpy that we discovered later that the knocking-about we had taken under our safety-belts had left our hips black and blue. We could not establish R/T. contact with Almaza tower and circled it three times. Landing finally, we discovered to our relief that it was their equipment which was out of order and not ours.

We had been notified by phone in Paris before leaving that our application for a landing permit for Egypt had been accepted. No particular field was designated, but on putting down at Almaza, we learned that we should have landed at Farouk. We were in considerable trouble. While we had lunch our case was reviewed and it was decided that we could go free provided we left the country within twenty-four hours of our arrival (seven of which had already been taken by formalities).

As soon as they let us we got on our way, flew over Heliopolis and as close as allowed to the Great Pyramid, the Sphinx and the Royal Palace. Through the burning air of little buoyancy the Navion laboured to gain height, the windshield gradually becoming opaque under the grease thrown from the constant-speed mechanism of the airscrew. Finally we were able only to see sideways, and at Luxor, where the setting sun was in the axis of the runway, I had to land by watching the ground behind the wing.

We were tourists on Friday and visited the temples of Karnak and Thebes, some mosques, and some tombs in the Valley of Kings on the other side of the Nile. This rubber-necking over-extended our time limit in Egypt, and before leaving on Saturday

SINGLE-ENGINE SAFARI . . .

morning we were involved in long explanations to the authorities. Before heading directly on our way south, we buzzed the temples and passed in a steep bank between the Colossus of Memnon to snap some pictures.

Progressing up the Nile, we watched the irrigated and cultivated lands which run along it gradually diminish and disappear completely after the lock of Assouan at the first cataract. All that was left was the dirty brown river flowing through dazzling arid desert.

Wadi-Halfa, at the northern border of Sudan, receives about two drops of rain twice a century; neither of them fell for our benefit, and we landed through dense heat mirages. Although we couldn't see an Air France Dakota which had just taken off, we made over V.H.F. a "blind date" for dinner with its crew in Khartoum.

At Wadi-Halfa we met the first of the very correct and efficient Hindu officials we were to find in all Sudan and East Africa. We filled up again with fuel, oil and Coca-Cola, temporarily abandoned the Nile to avoid its great bend, and flew over the railway which runs from Wadi-Halfa to Khartoum.

The river soon rejoined our route. We had to land at Atbara to wipe off an accumulation of grease from the windshield, and we took advantage of this stop to have the tanks refuelled by 14 half-negro Arabs who sprang out of a 1927 Buick. Our engine wouldn't turn over on the starter, nor would it start under our repeated efforts to swing the airscrew. It was a case of vapour-lock caused by one of the hottest flying sessions of the whole trip. There was nothing to do but lie in the shade of the wings and sweat out the Coca-Cola we had guzzled back in Wadi-Halfa. The Navion was turned windward, cowlings opened. Three hours later the engine answered the starter perfectly and we set out for Khartoum. We found amusing neither the never-changing river below us nor the bumping along in 85 degrees at 8,000ft.

We kept our appointment with the Dakota crew we had talked with earlier. Dinner was not only congenial—it was good.

Khartoum is divided in three towns by the junction of the White Nile and the Blue Nile, which latter comes from the high Ethiopian sierras. Everywhere it's hot, even at midnight, but the British have laid out enough tennis courts, cricket fields and public buildings to give the place a comfortable sophistication.

As usual we took off at dawn, this time with the Dakota which, of course, out-distanced us. They were bound to their Madagascar base. Still there was no vegetation, but the desert was slowly turning from reddish-gold to near black. Wiping the windshield was becoming a ritual, and we landed at Kosti. The natives were timid, but curious enough to watch us from a short distance away.

Sufficient Unto the Day . . .

Approaching Malakal, the sky became leaden and the intense heat grew even more oppressive. The rainy season was creeping up from the south and the weather forecast was pessimistic. It was 0830 and we had flown only four hours, but, hearing the report, we decided to call it a day. We left the Navion in the care of wonderful natives; their skins were tattooed in relief in the style of their ancestors, but, jammed low on their ears, they wore bright red firemen's helmets with "FIRE" inscribed in large white letters. They wore khaki uniforms; they had no shoes, of course, but took their jobs with painful earnestness, rushing to every incoming or departing aircraft, posed on their little fire truck with ultra theatrical stalwartness.

We bicycled to the village, where gigantic blacks paraded through the street stark naked, except for a coloured comb in their plastered and henna-ed hair and a match passed through the lobe of the ear. From there we sent a telegram to our friends in the Congo, announcing our probable arrival the next day or the day after (we beat the telegram by a week). Then we settled down under mosquito nets to watch an apocalyptic storm that weakened only at nightfall.

We left Malakal at daybreak; there were violent showers to fly around. Here the Nile runs through a maze of crocodile-infested swamps. According to regulations, we made a 350-degree turn at 500ft over Bor. Through the savanna under us roaming herds of elephants and antelope and giraffes could be admired. Soon, mountains appeared on the horizon and then we landed at Juba on the southern boundary of the Sudan. There is no weather station there, but it looked good enough to us.

After twenty-five more minutes of flying, we contacted by radio a SOBELAIR transport that was flying in the opposite direction, and its pilot was to tell us what kind of weather prevailed on the hop; but the atmospheric conditions made the transmissions hardly perceptible and unreadable.

The vegetation becomes luxurious at the first levels of the high regions of Central Africa. Scattered over the sky was big fluffy cumulus and a dry haze thickened as we advanced. Apparently, the mining and timber roads on our map, by which we had planned to navigate, bore no relation to the roads actually on the terrain. We spent fifteen unsuccessful minutes trying to reconcile the chart with what we saw below us, but finally had to admit we were lost.

The Temple of Ramses, across the Nile from Luxor.

The chaotic landscape bristled with tall escarpments and very little could be seen through the haze. On a heading in a generally acceptable direction, we took altitude on instruments, which was most disagreeable, as our D.G.I., regulated for European latitudes, precessed alarmingly around the equator. We knew that a wide flat area surrounds Irumu, whose beacon our A.D.F. soon picked up; we unquestioningly followed its directions. When it indicated that we were over the field, we spiralled down and could see it through the diminishing haze.

A Sabena liner landed shortly after us, coming from Costermansville. Over welcome Coca-Cola, its captain told us what weather he had encountered; generally it was favourable, but heavy storms were concentrated around the high volcanoes Nyaragongo and Karyssimbi north of Goma, our destination.

From Irumu south for about 150 miles lies a dense tropical forest, and it was while flying over this that we crossed the equator. We didn't realize it at the time, as we were too busy hoping not to have engine failure; it would have been absolutely impossible to find us in that mass of rotten trees, which would have gulped us instantly in case of a forced landing.

The air had cleared and we could perceive in the distance the enormous outline of the Ruwenzori, some 16,000ft high. On the horizon there were monstrous cumulo-nimbus topped by threatening mushroom-shaped caps. We finally reached Lake Edward and flew down its entire length; its tall banks (that overhung us) plunge vertically, eliminating any landing possibility. Our nerves were set further on edge by the thought that there might be crocodiles below (this, we learned later, is not the case, the altitude being too great to sustain such a form of life).

The sky to the south of the lake was inky; the scene was breathlessly impressive; we were flying, if I may say so, on tip-toe. At the moment we spotted Rutsuru and its emergency landing field, we were swamped in an avalanche of rain and hail. Diving deliberately in the direction of Rutsuru, we prepared to land as soon as we saw the field again. A few feet from landing, we spied through the furious clouds a tunnel-shaped opening. With only 80 kilometres to go, we took the chance. We could do nothing but buzz the road, which climbed with us at 300ft a minute.

Then we broke through the pass between the volcanoes and found before us Lake Kivu and Goma-Kyssenyi, calm in a beautiful evening light. There was no sign of the turbulence that had been shaking us two minutes earlier. To announce our arrival, we flew low over the beach of this little Riviera with its multi-coloured flowers and gaudy birds.

(To be concluded)

NEW BRITISH STANDARDS

AMONG recently published British Standards of interest to the aircraft industry are : B.S. 1844 : 52 for enamel round copper wire (vinyl acetal base enamel), price 4s; B.S. 1855 : 52, dimensions of bifurcated, tubular and semi-tubular rivets (4s); B.S.A. 57 and 58 : 52, shear bolts and nuts for aircraft; (3s each); B.S.S. 115 : 52, for 1 per cent chromium steel (wires only, for the manufacture of cold-forged aircraft bolts of ¼in shank diameter and over). price 1s; B.S.G. 100 : 52, general requirements for electrical equipment and indicating instruments for aircraft (6s); and B.S.G. 140 : 52, hand-operated A.C. circuit breakers for aircraft (1s 6d). Copies, at the prices quoted (which include postage), are available from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1.

The 1952 edition of the *British Standards* 1952 *Year Book* has just been published. It contains a complete list of the 1,800 British Standards current at March 31st, 1952, with a brief description of the subject matter of each. A subject index simplifies reference.

Copies of the *Year Book* may be obtained at 7s 6d from the British Standards Institution at the address given above.

RACING LIGHTWEIGHTS

Thoughts on the R.Ae.C. Design Competition and British and American Practice

By R. PRIZEMAN

THE Royal Aero Club is to be congratulated on the organization of its competition for a design of a single-seat racing aircraft. There is no doubt of either the general public's interest or of the amateur pilots' enthusiasm for a plan which can supplement our present rather confused and abortive handicap races with safe, fast and exciting closed-circuit events.

The past twenty years have seen the building of but a few British racing aircraft, e.g., the Miles Sparrowhawk and Speed Six, the de Havilland Technical School's T.K.4 and the Percival Mew Gull (the Chilton and Comper Swift should more properly be classed as "sports aircraft"). None of these designs, however, exhibits the refinement to be found in small American racing aircraft, so it is instructive to examine aircraft that have been built in the U.S.A. for the "190 cubic inch" class—a specification on which that of the R.Ae.C. is based. (Races for these aircraft were, until 1951, sponsored by the Goodyear Tire and Rubber Company; now Continental Motors do this job.)

The fatal accidents which did occur in some of these races led a large section of the American aeronautical Press to condemn (or, at best, to ignore) these races—an attitude followed glibly by many people in this country. However, the design of the aircraft provides a fascinating study and anyone considering entering the R.Ae.C. competition would be well advised to investigate them.

Tightening the Rules

Aircraft built for competition in America now have to satisfy a stringent specification, and are thoroughly inspected by the National Aeronautic Association and the Professional Race Pilots Association, who also demand a minimum standard of piloting. A comprehensive series of flight tests has to be passed. This includes—to mention but three requirements—a 6g pull-up, a dive at 1.3 maximum level flight speed, and a demonstration of the ability to slow roll without appreciable loss of height.

The racers must have an American approved engine of less than 190 cu in. displacement (3.1 litres). Modifications, such as a change of compression ratio, are not permitted.

The unanimous choice is the Continental 6.85 flat-four engine, which nominally produces 85 b.h.p., but polished ports and careful tuning can raise this figure considerably. Competitors are loath to admit the powers they actually achieve, but it is known that, by raising the r.p.m. by about 1,000, 100 h.p. can be reached!

In view of the absence of a British engine in the same category, it is greatly to be regretted that American engines are denied us, as aircraft built to the R.Ae.C. specification could not compete in the U.S.A. In any case, an aeroplane designed for, say, a Cirrus Minor, would be at a disadvantage if fitted with an American engine of similar power but less weight. The suggestion by the R.Ae.C. that a Turboméca power-plant can be used is intriguing, as the Americans are investigating the prospects of jet power.

No apology is made for this continued comparison with the N.A.A.'s specification, as it is from this that the R.Ae.C.'s comes. For instance, the requirements for visibility and the (blindingly) obvious need for a crash-arch are copied word for word.

The simply-stated strength requirements (that the aircraft should be suitable for a C. of A.) are unlikely to cause difficulty, but it should be borne in mind that, if the aircraft is intended for the semi-aerobatic category, it is required to take only 4½g, as against 6g for an aerobatic C. of A. or U.S. races.

The N.A.A.'s stipulation that airscrews must be of fixed pitch has led to the development of "flexible" types, which have fine pitch when static, coarsening as speed builds up. In a massed start race good acceleration is vital; a conventional airscrew designed to give maximum efficiency at, say, 190 m.p.h. may be stalled up to 40 m.p.h.

It is probably fair to say that, for the type of aircraft under discussion, fixed-pitch airscrews, with their lower weight and cost and increased reliability, are to be preferred to mechanically-variable-pitch types. Especially is this so in view of the work at present being carried out on laminar profiles and lower thickness/chord ratios.

A vital and interesting stipulation by the Americans is that midget racers must not have less than 66 sq ft of wing area. This gives, as a typical wing, span 20ft, root chord about 4ft, and aspect ratio of 5.

A minimum dry empty weight of 500 lb was at one time demanded. More reliable design and inspection (in other words—progress) has enabled this requirement to be dropped. Thus, the take-off weight of an American midget racer may be less than 800 lb, which contrasts with the R.Ae.C.'s sole weight stipulation that the weight shall not exceed 1,102 lb. This is a situation probably occasioned by our need to turn to the bigger power plants available.

The speeds attained by the "Continental" racers are truly impressive: some can attain 220 m.p.h. straight and level. The 1951 race was won at 197.218 m.p.h. over a course of 15 laps of a 2½-mile circuit (37½ miles). This should be compared with Ron Paine's 100 km closed-circuit speed record of 192.83 m.p.h.—achieved in the Hawk Speed Six on 200 h.p. as opposed to the American nominal 85.

Business participation in the American midget racer scene is slight, the majority of entrants flying for the thrills rather than in the expectation that their technically-not-so-good designs can get in the money. In post-war years, enthusiasts in the American aircraft industry have been responsible for the limited production of expensive professional looking planes like the *Cosmic Wind* and Long *Midget Mustang*.

All U.S. racers have bubble hoods, which can be obtained for $50. While British manufacturers nonchalantly give quotations of over £100 for a similar product, this is something we shall have to do without.

In the search for extra cleanness, some unusual designs have appeared. Of particular note is the Par Special, built by Parks Air College graduates, now employed by McDonnell Aircraft Corporation. This pusher design has a variable-incidence wing, butterfly tail, tandem-wheel undercarriage and thrust-augmenting exhaust. It is also unique in having a British airscrew—a 56in. diameter Fairey metal type.

Many design developments in the lightplane field were originally tried on U.S. midget racers. Their creators have never shrunk from the unorthodox. Even two years ago, thrust-augmenting exhaust stubs, flexible airscrews and boundary-layer drift strips on the wings were quite common.

It is certain that the encouragement now being given to aviation enthusiasts by the Royal Aero Club competition, though in a seemingly lighthearted field, will create a progressive interest in design which will benefit the whole aircraft industry and revitalize the lightplane scene.

[*An interesting letter, comparing the "Cosmic Wind" with the Mew Gull, appears in "Correspondence" (page 724) of this issue—Ed.*]

INTERCHANGEABLE PRESS-TOOL SET

COMBINING the advantages of pillar-type press tools with the economy of interchangeable die sets, a new product of The Plessey Co., Ltd., Ilford, should afford considerable savings in time and expenditure. Three sizes of permanent bolster sets are provided to take nine sizes of interchangeable die, from 3in square up to 5in by 6in. Each die set consists of backing and punch plates, stripper and die, all of which are supplied pre-machined, accurately ground and assembled. The tool set is described in a well-produced four-fold broadsheet available from the company.

Left to right: Mr. W. S. Farren (Knight Bachelor), A.Cdre. Vernon Brown (Knight Bachelor), Mr. G. R. Edwards (C.B.E.), Mr. H. Sammons (C.B.E.), Mr. E. C. Bowyer (C.B.E.).

THE QUEEN'S BIRTHDAY HONOURS

Recipients in the Aviation Community

THE names of several men widely known in aviation—and of many others less well known—appear in the first Birthday Honours of the new reign. Many R.A.F. officers figure in the military divisions of the various orders; their names are listed in our "Service Aviation" section, on page 729. On this page we give names from the civil divisions, and it will be seen that among them are four men who become Knights Bachelor: A. Cdre. Vernon Brown, who was for nine years Chief Inspector of Accidents, Air Ministry, after his retirement from the R.A.F. in 1937, and who has since occupied a similar post in the Ministry of Civil Aviation; Mr. W. S. Farren, technical director, A. V. Roe & Co., Ltd., since 1947; Mr. J. H. Keeling, deputy chairman of B.E.A. for the past five years; and Professor B. H. C. Matthews, Professor of Physiology at Cambridge University, on whom the honour is conferred in recognition of "services to the Air Ministry."

B.O.A.C. Captains Ballantine and Parker, who flew the Queen back from Africa on the death of King George VI, are made Members of the Royal Victorian Order.

Among members of the aircraft industry whose names appear in the list are (in addition to Mr. Farren) Mr. E. C. Bowyer (C.B.E.), director of the S.B.A.C.; Mr. G. R. Edwards (C.B.E.), designer of the Viscount, Valiant and other Vickers-Armstrongs aircraft; Mr. H. Sammons (C.B.E.), managing director of D. Napier and Son, Ltd.; Mr. P. J. Ellis (O.B.E.), managing director of R. B. Pullin and Co., Ltd., the instrument manufacturers; "Roly" Falk (O.B.E.), Avro test pilot; W/C. Pike (O.B.E.), manager of the D.H. airfield at Hatfield and of No. 1 R.F.S., Panshanger (recognized in the list in connection with his Air Training Corps work); Mr. T. J. Gale (M.B.E.), designer at the Pulsometer Engineering Co., Ltd.; and Mr. T. C. Parker (M.B.E.), production manager at Vickers-Armstrongs' Weybridge works.

KNIGHTS BACHELOR

A. Cdre. Vernon S. Brown, R.A.F. (ret.), Chief Inspector of Accidents, M.C.A.

W. S. Farren, technical director, A. V. Roe and Co., Ltd.

J. H. Keeling, deputy chairman, British European Airways.

B. H. C. Matthews, Professor of Physiology, University of Cambridge.

ORDER OF THE BATH

C.B.

R. C. Chilver, Asst. Under-Secretary of State, Air Ministry; H. G. Lindsell, Under-Secretary, Ministry of Supply.

ROYAL VICTORIAN ORDER

K.C.V.O.

A. Cdre. E. H. Fielden, R.A.F.

M.V.O. (FOURTH CLASS)

Capt. R. G. Ballantine, B.O.A.C.; Capt. R. C. Parker, B.O.A.C.

ORDER OF THE BRITISH EMPIRE

C.B.E.

L. J. Banford, Director of Contracts, A.M.; E. C. Bowyer, director, S.B.A.C.; S. A. Davis, Regional Controller, Midland Region, M.o.S.; B. G. Dickens, Director of Technical and Personnel Admin., M.o.S.; G. R. Edwards, chief designer, Vickers-Armstrongs, Ltd., Weybridge Works; W. J. Richards, Chief Superintendent, Telecommunications Research Establishment, M.o.S; R. L. Smith-Rose, Director of Radio Research, D.S.I.R.; H. Sammons, managing director, D. Napier and Son, Ltd.; L. M. Snelling, Director of Contracts (Air), M.o.S.; H. E. Snow, deputy director, Anglo-Iranian Oil Co., Ltd.; H. Sutton, Director of Materials Research and Development (Air), M.o.S.

O.B.E.

Capt. W. J. Craig, captain of B.O.A.C., Stratocruiser and Constellation fleets; P. J. Ellis, managing director, R. B. Pullin and Co., Ltd., Brentford; R. J. Falk, test pilot, A. V. Roe and Co., Ltd.; T. H. Gill, senior radio engineer, H.Q., 90 Group, R.A.F.; E. Grundy, manager, Ferranti, Ltd., Moston; J. O. Hughes, principal scientific officer, R.A.E.; S. K. Janson, engineer, grade I, Armament Design Establishment, M.o.S.; K. C. H. Martin, Deputy Chief Surveyor, A.M.; G. Noble, manager of Fawley Refinery, Esso Petroleum Co.; W/C. C. A. Pike, chairman of No. 220 and No. 2203 Sqns. A.T.C.; K. B. Ross, lately general refineries manager, Anglo-Iranian Oil Co., Persia; E. Schofield, superintending civil eng. grade I, A.M.; Mrs. L. Silverston, asst. sec., M.o.S.; G. W. Stallibrass, Deputy Director of Control and Navigation (Development), M.C.A.; R. L. Stubbs, secretary, British Non-Ferrous Smelters' Assn.; M. Willcocks, manager, Anglo-Egyptian Oilfield Refinery, Suez; P. L. Wostear, lately Assistant Director of Radio Production, M.o.S.

M.B.E.

G. C. Ashworth, sen. exec. off., M.o.S.; Miss E. Baker, higher exec. off., M.C.A.; W. F. Barnett, chief exec. off., M.o.S.; W. S. Bond, exec. off., M.o.S.; G. A. Champniss, ops. officer, grade II, M.C.A.; J. A. Doak, sen. exec. off., M.o.S.; W. R. Dunderdale, sen. rep., International Aeradio, Ltd., Damascus; H. H. Fell, mech. and elec. engr, Directorate of Works, Air M.; J. H. Freeman, lately manager, Coryton Oil Installation, Vacuum Oil Co.; T. J. Gale, designer, Pulsometer Engineering Co., Ltd.; E. Garthwaite, chief engr., Marconi Instruments, Ltd., St. Albans; A. H. Hibbert, sen. exec. off., A.M.; E. H. Milne, higher exec. off., M.C.A.; C. E. Nash, chief draughtsman, Radar Research and Development Establishment, M.o.S.; T. C. Parker, production manager, Vickers-Armstrongs, Ltd., Weybridge; D. B. Parkinson, hon. sec. No. 1172 (Esher) Sqn. A.T.C.; T. R. Pett, civilian tech. supt., No. 5 M.U., R.A.F.; Miss E. A. Scott, exec. off., A.M.; L. C. Skinner, sen. exp. off., Civil Aircraft Research and Development Branch, M.o.S.; F. C. Strangeman, higher exec. off., A.M.; G. F. Taylor, engr. grade II (supp.), M.o.S.; H. F. Taylor, chief exec. off., M.o.S.; F. G. Templeman, station engineer, East African Airways, Dar-es-Salaam; D. H. Thompson, district manager (Malaya), N.A.A.F.I.; A. W. Watkins, chief engineer, East African Airways.

BRITISH EMPIRE MEDAL (CIVIL)

W. J. A. Bain, in charge, B.O.A.C. Testbed Site, Treforest; H. J. Banks, skilled fitter, Air Service Training, Ltd.; E. W. Bones, clerk of works, grade II, R.A.F., Biggin Hill; F. E. Dunster, charge-hand labourer, No. 3 M.U., R.A.F., Milton; C. Elliott, charge-hand aerial erector, R.A.F., Stanbridge; Mrs. F. A. Garside, canteen manageress, R.A.F., Weeton; Mrs. E. E. Hall, cook, R.A.F. Hospital, Uxbridge; J. M. Jones, aircraft assembler, de Havilland Aircraft Co., Ltd., Chester; H. Kateley, charge-hand toolmaker, R.A.E.; E. Warne, asst. foreman, R.A.E.

IMPERIAL SERVICE ORDER

F. R. Ivens, chief exec. off., M.C.A. (Wallington); C. W. A. Millar, chief exec. off., A.M. (Reading).

Left to right: Capts. R. G. Ballantine and R. C. Parker (M.V.O.); Mr. R. J. Falk (O.B.E.).

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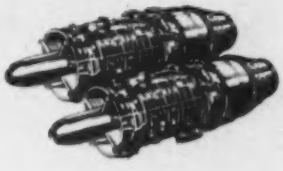
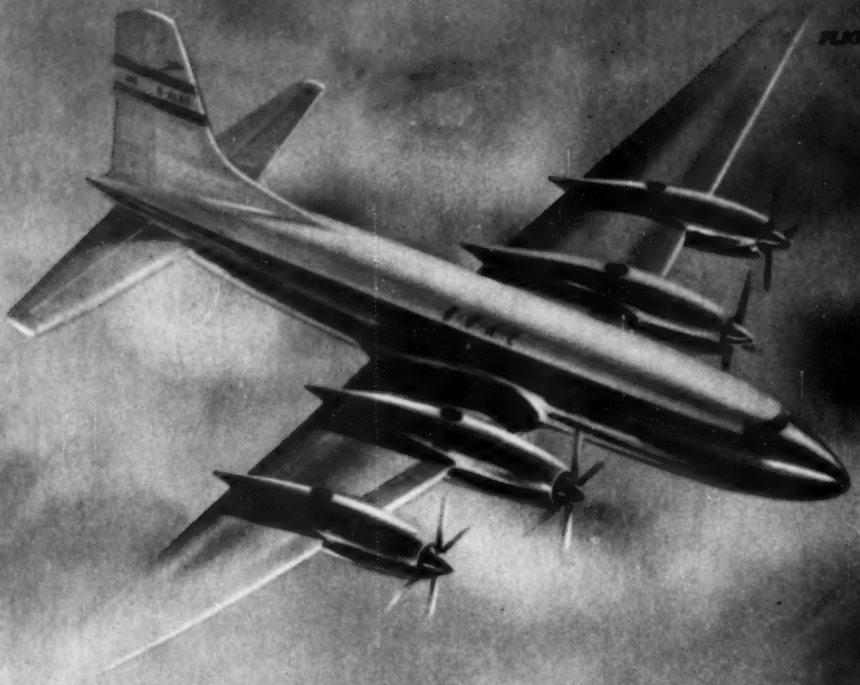
GA·5 GLOSTER AIRCRAFT

ENGINES BY ARMSTRONG SIDDELEY

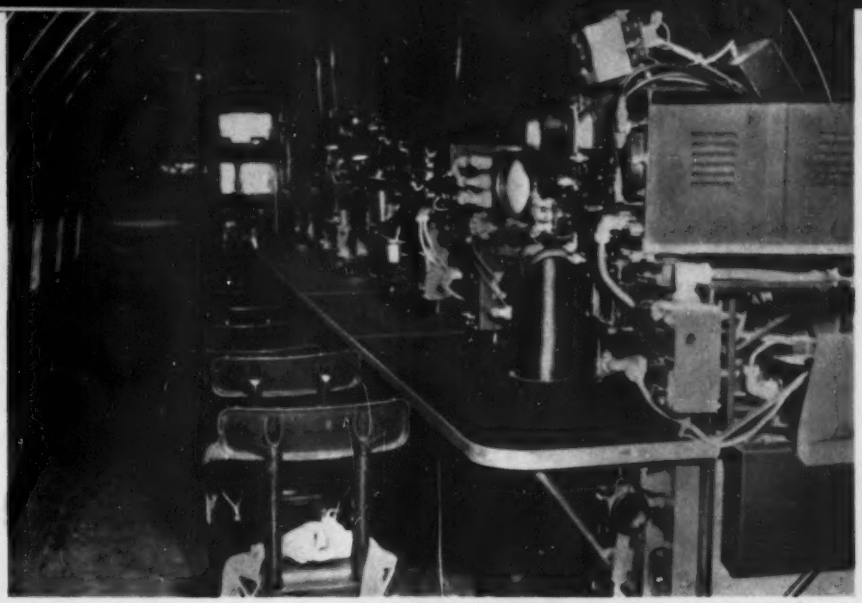




de Havilland
hollow-steel-blade constant-speed
feathering and reversing propellers
have been chosen for the fleet of 25
"Bristol" Britannia airliners (four "Bristol"
Proteus gas turbines) ordered by
The British Overseas Airways Corporation

DE HAVILLAND

DH PROPELLERS



R.C.A.F. FLYING CLASSROOM

A Well-tried Dakota Modification for Radio and Radar Training

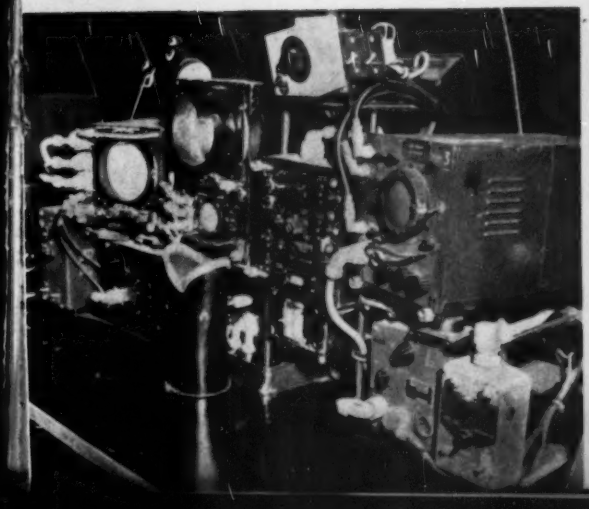
A NUMBER of different aircraft types have lately been designed for or adapted for work as flying classrooms. In particular, the Vickers Varsity and Valetta and the Handley Page (Reading) Marathon have recently been dealt with in *Flight*, and reference has been made to the proposed Percival Pembroke crew trainer. It is not long since the R.N.Z.A.F. took delivery of D.H. Devons, which are also to be used for crew training. Still another type, this time an adaptation, is employed by the R.C.A.F. for the training of aircrew radio officers (all aircrew in the R.C.A.F. are commissioned). These trainers, modified Mk 3 Dakotas, have now been in service for several years and have proved themselves well suited to the purpose for which they were adapted. The modifications were carried out by a civilian aviation company, Northwest Industries, Ltd., of Edmonton, Alberta.

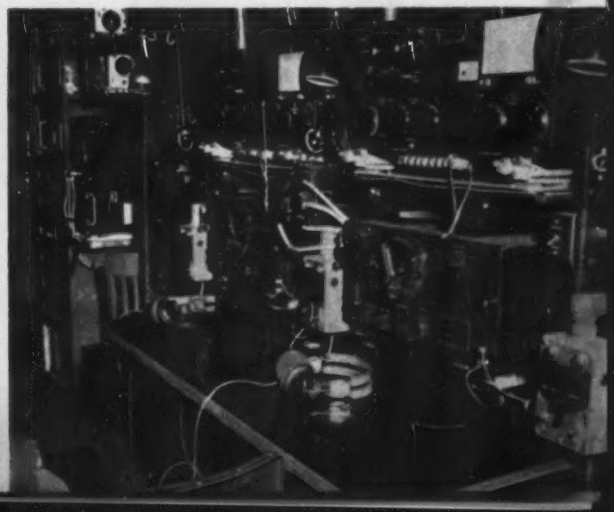
These flying classrooms (writes an R.C.A.F. officer) are used by the R.C.A.F. Air Radio Officer School at Clinton, Ontario, on regular seven-hour training flights, and the aircraft are capable of training six students at one time on airborne communications and radar equipment. A special installation in the instructor's position enables the instructor to monitor at will the transmissions or reception of any student. For daylight operation of the radar equipment, which includes H2S, Loran (APN 4) and Rebecca (APN 2), the radar compartment is blacked out by a midship curtain.

The accompanying pictures show the interior arrangement. The leading photograph, taken from the rear of the aircraft, gives the overall view of the interior with the radar equipment in the foreground. The forward training positions are utilized for communications equipment training.

In the illustration below (*left*) is seen the H2S and Rebecca installation; this gear is used for air training in radar map reading, blind bombing and homing runs.

The remaining picture shows the communications training equipment, consisting of two ART 13 transmitters (Collins autotune) and two BC 348 receivers in the foreground. In the background, forward of the main bulkhead, can be seen the SCR 287 (BC 375 and BC 348) and SCR 274N installations. The jackbox arrangement at all positions enables the student to call the instructor by means of intercom or signalling light.





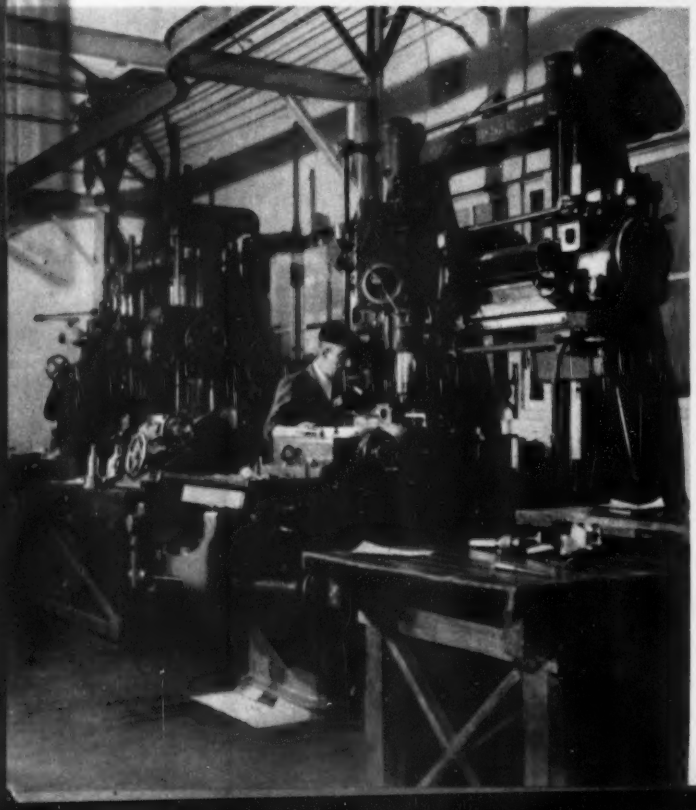
MM. Bernard Perise (left) and Louis Nouget prepare a Turboméca for test. Both these workers earn 30,000 francs a month.

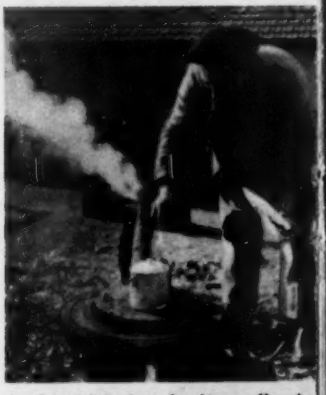
Ear-muffed, MM. Perise and Nouget are glimpsed throug

CHEZ TURE

SOME highly uncomplimentary things have been aircraft industry; yet there is much about it wh nothing more so than the way in which the little Turb brought to fruition. In this instance, surely, the fam French are good at producing fancy-looking proto building them in quantity and exploiting them, is u the eagerness with which the Turbomécas are bei designers of many nationalities. They are built at Pyrénées country, and the atmosphere of the factory day, 49-hour week—is conveyed with great sincerity guiding genius of the business is Monsieur J. R. Szy began making compressors in 1938. When the Germa the staff, *en bloc*, declined to co-operate; so the plan the machines were sent to Germany. Ironically eno under way once again after the war with the aid of a t tists who had been employed at Bordes on rocket rese

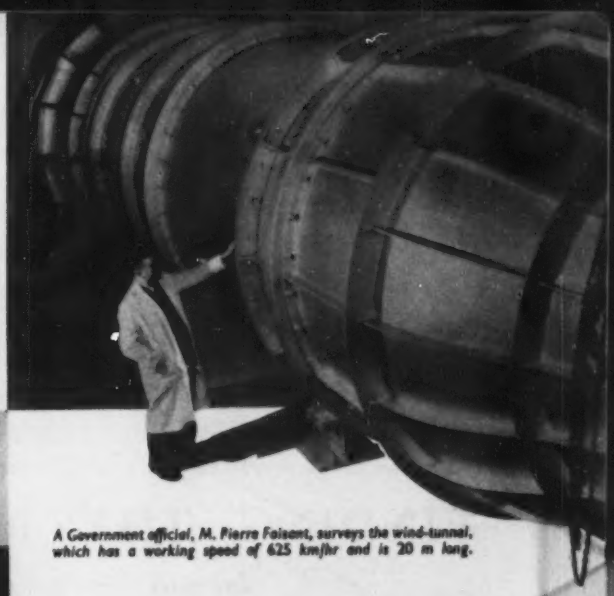
Tending a machine behind foreman Gaston Mansencal is Jean Caritan, whose monthly salary is 48,000 francs.





M. Gabriel Laborde prefers his own fête cha jambon sandwich and café to the staff ca

h a window of the test chamber.



A Government official, M. Pierre Faisant, surveys the wind-tunnel, which has a working speed of 625 km/hr and is 20 m long.

Monsieur J. R. Szydlowski—long associated with aircraft power-unit design—is the founder and president of a flourishing little company.

BOMECA

n said about France's hich is admirable, and omeca units have been iliar assertion that the types but hopeless at ncalled for, as witness ng sought by aircraft Bordes, in the Basses—which works a five- by these pictures. The ydlowski, and the firm as took over the works, it was dismantled and ugh, the company got eam of German scien- arch.

(Below). *A general view of the shop in which Piméné, Palas, Marbore, Aspin and Artouste are assembled.*

npêtre of teen.

Controlled approach, the subject discussed at the I.A.T.A. technical conference outlined below, is demonstrated here by a B.E.A. Viking.

FINDING THE RIGHT APPROACH

I.A.T.A. Delegates Discuss a Critical Phase of Flight Operation

ONE of the most successful of the many international meetings convened by I.A.T.A. was the technical conference held at Copenhagen from May 5th to 17th, when the main item on the agenda was a ten-day discussion attended by over 100 representatives of airlines and other interested organizations of the problems involving final approach and landing.

The discussion was based on the assumption that, while very large amounts of time, energy and money are being spent on the development of specific aids and procedures for this critical stage of flight, not enough attention has been given to the inter-relationship of these installations, instruments and processes and the pilots who must use them.

The conference gave airline aircrew personnel a unique opportunity of putting forward to engineers and scientists their views and requirements; in the words of one participating pilot, the problem was : "To get us the 'black boxes' that we need to help us fly rather than to fly according to whatever 'black boxes' we can get." The approach discussion was informal and no specific conclusions or recommendations were made; however, the I.A.T.A. Technical Committee has approved the tentative assertion that present operating minima can be lowered "quite substantially" with equipment now known or available in the near future.

It is estimated that the Copenhagen delegates spent approximately 17,000 man-hours discussing this phase of flight—which itself lasts only about two minutes. At present it is obviously impossible even to summarize records of the discussion, which will run to several thousand pages and which will have to be edited and studied by I.A.T.A. over a period of months before all implications are realized.

The following outline, however, serves to indicate the main points studied by delegates at Copenhagen.

As mentioned, the final process in approach and landing normally occupies about 120 seconds. In bad weather some 105 seconds may be spent in guiding the aircraft on instruments and ground advice to the point where the pilot can decide, on visual evidence, whether he should land or go round again. Under existing rules this point of decision normally cannot be lower than 200ft above the ground. In practice, most airlines operating large transport aircraft have pushed the minimum up to at least 300ft. In the first part of the approach the pilot relies on instruments to provide him with information as to his approximate height, speed and attitude, the direction of the runway, his distance from it, his approximate heading and displacement from the glide path and his rate of descent. Further information is provided by R/T. from the ground. When the runway comes into view his attention is concentrated mainly on the runway itself and on its markings and lighting. At every stage of the approach he must translate facts into physical action.

As the link between all the information supplied from the ground and by the aircraft instruments, the pilot himself was the subject of special study during the conference. The basic characteristics of the average airline pilot—referred to as "Joe" by the delegates—were nicely summed up by one R.A.F. pilot present in the following terms : "Man is not as good as a black box for doing certain specific things. However, he is more flexible and reliable. He is easily maintained and can be manufactured by relatively unskilled labour."

The whole process of approach and landing is influenced by an inherent limitation in Joe himself—the amount of time which he requires to adjust his own processes from instrument to visual conditions when he has broken through cloud and reached the point of decision. This was termed his "exposure time" and was reckoned to require a minimum of about 15 seconds. It was believed that Joe would always need this time for the decision he must take — even if fully automatic couplings may at some future date relieve him of the task of computing.

As a complement of "exposure time," Joe was felt to have still another requirement for a certain continuously visible segment of the approach and runway areas before him, sufficient to permit him to carry on his job with what the conference termed "tranquillity of spirit." This "reaction time," though related to exposure time and to the type of aircraft and flight conditions, was reckoned to be about three to five seconds—that is, Joe must see ahead of him a distance

Airport staff play a vital part in the process discussed. Below are approach controllers in the tower at London Airport.

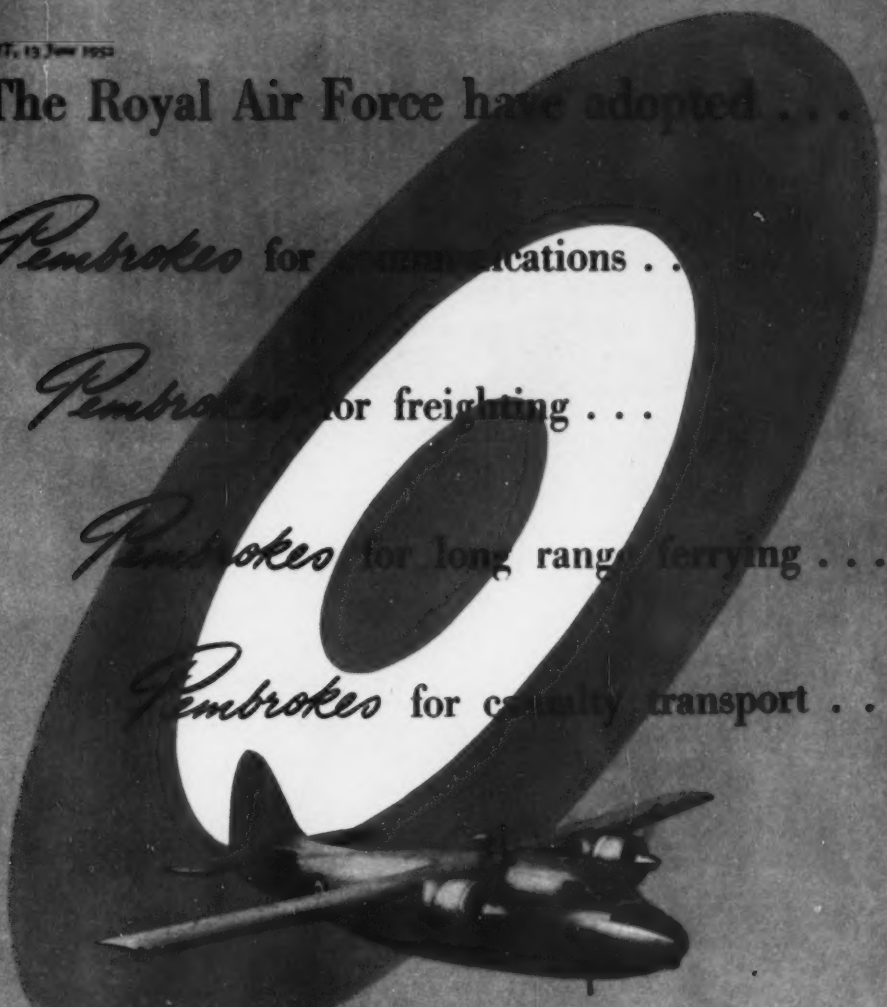
The Royal Air Force have adopted . . .

Pembrokes for communications . . .

Pembrokes for freighting . . .

Pembrokes for long range ferrying . . .

Pembrokes for casualty transport . . .



THE *"Pembroke"*

The R.A.F. version of the Percival *"Prince"*

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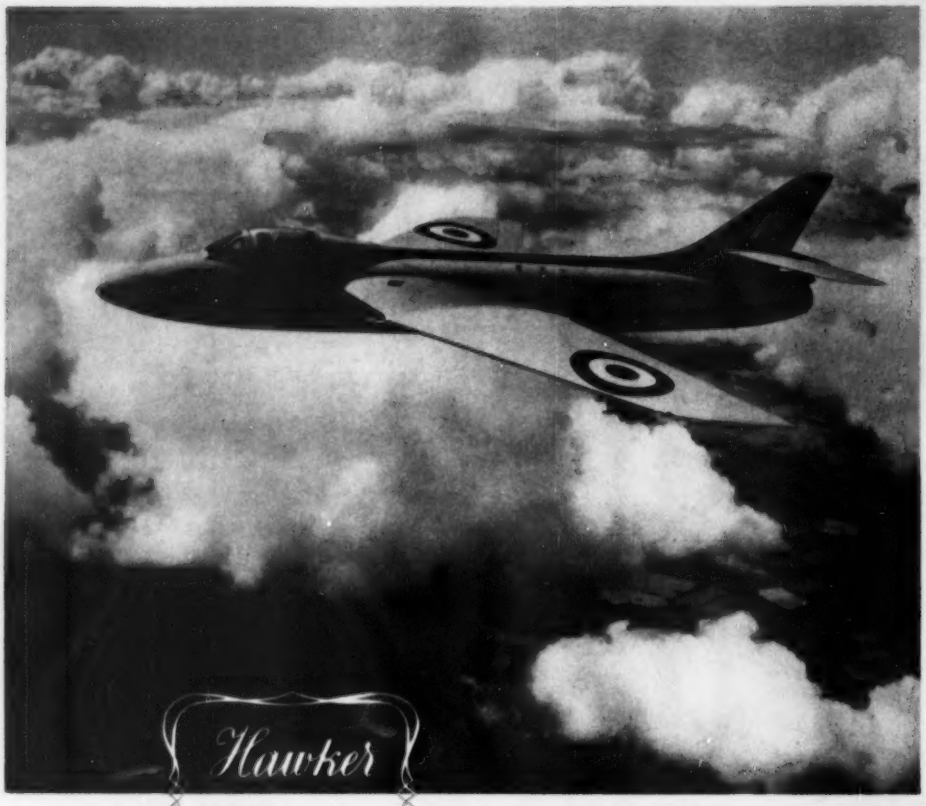

Ejection Seats designed by the Martin-Baker Aircraft Co. Ltd. and fitted to all high-speed aircraft

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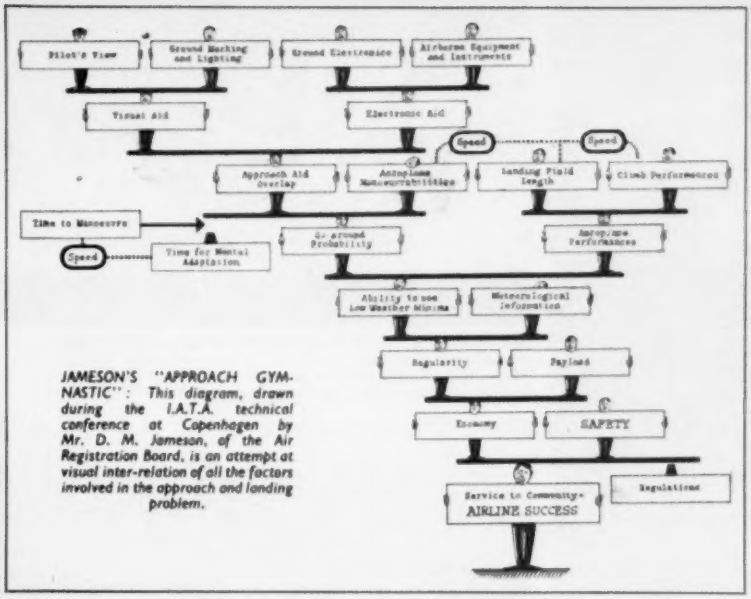


JAMESON'S "APPROACH GYMNASTIC": This diagram, drawn during the I.A.T.A. technical conference at Copenhagen by Mr. D. M. Jameson, of the Air Registration Board, is an attempt at visual inter-relation of all the factors involved in the approach and landing problem.

FINDING THE RIGHT APPROACH . . .

at least equal to that which his aircraft is covering in that time. It was stressed, however, that, if Joe must have 15 seconds in which to do a certain job, his aircraft should not have so high a landing speed as to prevent him from getting that time allowance. If it does, he must reach his point of decision further back along the approach and the aircraft will require a correspondingly much higher minimum.

Delegates also underlined the importance of the relationship between the pilot's tranquillity of mind and (a) the stability of his aircraft during changes of power, and (b) its stall characteristics during flare-out. Flaps, it was felt, should retract very quickly up to the approach or climb setting during an overshoot, but more slowly thereafter. Finally, Joe was determined to be very much a creature of habit and instinct, capable of performing unusual actions only if he could practise them constantly. It was thus concluded that any approach procedures or devices worked out for his use should be based on his normal reaction and not on special ability. The conference stressed that human engineering must be given a great deal more research and study.

Consideration was then given to the problem of lowering the operational ceiling for approach and landing. The 200ft ceiling was felt to be justified more by custom than by rational analysis. Fully automatic landings under absolute zero conditions were felt to be feasible, but it was thought that the number of extra landings thereby facilitated would not justify the cost. The conference decided that the downward limit of improvement was within 100ft of the ground.

Following discussions of the I.L.S. system, which provides the pilot with a glide-path and a localizer which tells him the displacement of the aircraft from the extended centre-line of the runway, it was decided that the indications of height and distance which this system provides at the critical stage of the approach could be made more accurate and reliable. Furthermore, the information should be related not so much to the threshold of the runway as to the critical height at which Joe must make his decision. This would permit him to use a longer, shallower flare-out before landing and to make greater use of the first section of the runway and the whole range of approach lights. Other possible improvements to the I.L.S. system considered at the conference included the restriction of angular coverage afforded by the localizer to a minimum of about 10 deg to each side of the "on course" zone, in order to obviate beam-bending. The system, it was felt, should be planned to provide reliable guidance down to a height of 50ft.

On the subject of visual aids, it was emphasized that runway and approach lights and runway markings should be properly balanced, particularly in regard to the intensity of the lights themselves, and developed to the same standard.

There was agreement on the need for carrying approach-light guidance forward on to the runway. Unless the pattern of visual guidance was improved, the benefits of flight directors such as the Zero Reader would largely be wasted. A recent development of the Ministry of Supply's Blind-Landing Experimental Unit was cited as a good example of possible improvement; the system involves the installation of stub bars of lights at right-angles to, and outboard of, the runway lights in the first 2,000ft of the runway at 500ft intervals.

It was agreed that the outer portion of the approach-lighting configuration should be basically designed for use with manual coupling, the centre portion for manual and Zero Reader types of coupling and the inner portion for all types of coupling.

After discussing the vexed question of meteorology, the conference concluded that although it was desirable to provide Joe with runway visibility and slant visibility in addition to the information now given (a statement of ceiling and visibility as observed from the weather office—sometimes miles from the runway), the problems of forecasting should be given further study before any specific recommendations were made. The conference next considered economic aspects, deciding that any improvement in present operating conditions was bound to reduce overall airline costs—by cutting not only delays and diversions, but also the economic penalty imposed by extra fuel loads. It was urgently necessary for manufacturers to realize the serious implications which result if an aircraft cannot be operated with required regularity under existing conditions. Study by airlines of the accompanying diagram was recommended.

The conference drew no specific conclusions, for its task was to develop a record of information for further study, but the I.A.T.A. Technical Committee afterwards stated that: "Integrated approach and landing aids consisting of an I.L.S. and visual aids such as those recommended by I.A.T.A. are considered now capable of producing a good degree of success with most current (1952) types of transport aeroplanes, using standard instrumentation, down to runway visual ranges substantially lower than present operating minima. Further improvements in electronic or other aids or couplings are expected in the future either further to reduce the runway visual range required or to increase regularity."

In addition, it is probably safe to conclude that while the development of some new system answering all the problems in all weather operations is not impossible, no such system is anticipated at present. The conference also left a definite impression that there is a lower limit to improvement in weather minima beyond which the cost may prove prohibitive, and that the use of higher landing speeds may even cause minima to be raised.

This brief outline may appropriately be concluded by an encouraging statement issued by I.A.T.A. on the overall benefits of the conference: ". . . A new pattern has been set for the resolution of those technical problems which the airlines bring into the framework of I.A.T.A. . . . it promises to be a most effective one. With the development of the air transport industry, subjects which could formerly be allotted to specialist groups are becoming more and more closely interrelated. The problems which face the airlines during the coming years are obviously growing in complexity and their solution will benefit from, if indeed it does not absolutely require, initial consideration by groups in which all interested parties participate. In the Copenhagen sessions, the electronic engineers derived considerable value from a greater knowledge of how their work is related to that of the lighting engineer and to the actual performance of the aircraft, the dimensions of the aerodrome and the pilot's flight problems. The same is true, in many variations, of all of the other types of specialists participating."

A FILM ON OIL FILMS

A NEW film produced by the Esso Petroleum Co., Ltd., and entitled *The Basic Principles of Lubrication*, is now available (in 16mm copies) for loan to universities, technical colleges, research organizations, trade associations, and others to whom it may be of interest. Beginning with an explanation of the elementary laws of friction, the film is divided into four parts: friction; fluid-film lubrication; boundary lubrication; and extreme-pressure lubrication, and full use is made of laboratory experiments, micro-photography, animated diagrams and radio-active techniques. The running time is 55 minutes.

Applications for loan of the film should be made to the Manager, Industrial Sales Department, Esso Petroleum Co., Ltd., 36 Queen Anne's Gate, London, S.W.1.

(Left) When on local leave the A/P/O.s find no lack of sights to see. Here an Anson of the Rhodesia Air Training Group crosses the Victoria Falls. (Above) A prerequisite for success is an understanding between instructor and pupil. Both acknowledge the merits of the Chipmunk.

TRAINING IN RHODESIA

DURING the war years a total of 8,500 British aircrew were trained in Southern Rhodesia, and in May, 1946, the Air Ministry began negotiations to revive the training scheme, which had lapsed with the ending of hostilities. Work recommenced in January, 1947. Chipmunk basic trainers now equip the Flying Training Schools at Heany and Thornhill, and applied training is given in Harvards. Pupils accepted for short-service commissions go out to Rhodesia as acting pilot officers and spend nine months in the colony before qualifying for their wings. Southern Rhodesia provides an admirable ground for developing and exercising initiative and officer qualities, and these progress side by side with the flying training.

After a cross-country flight a Chipmunk turns over the Khami Dam.

The F.T.S. at Thornhill is surrounded by bundu—the open tree-covered terrain of the colony and home of a great variety of wild life.

Staff, instructors and airmen are fortunate in the liberal scale of married quarters available. Above is a warrant officer's bungalow at Thornhill. (Below) No great distance from the R.A.T.G. Headquarters is Cecil Rhodes' grave; here a Zulu guard acts as guide to two visiting airmen.

TRANSATLANTIC VARIETY

The Post-war Products of Lockheed Aircraft: Successful Military and Civil Ventures

By MAURICE F. ALLWARD

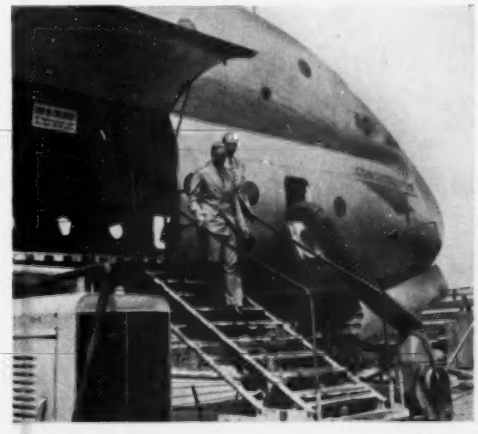
MOST American aircraft companies passed through a difficult time just after the war. Government orders were rapidly reduced to those appropriate to peacetime and, before long, production lines were completing one aeroplane for every fifty turned out during the war.

The big Lockheed Aircraft Corporation, of Burbank, California, was no exception; but, by pursuing a policy of not putting all their energies into one hangar, they contrived to produce a surprisingly wide variety of aircraft that enabled them to ride the lean years relatively easily. Lockheeds have, in fact, probably developed one of the widest ranges of civil and military types since the end of the war. Big naval transport, sleek civil airliner, long-range patrol bomber or swift fighter—Lockheeds have produced them all, as the following list shows: Constitution, Constellation, Neptune, Shooting Star and F-90.

Of these, the best known is, of course, the Constellation. It has been said that a measure of the greatness of an aircraft lies in its capacity for development and on this score the "Connie" is undoubtedly one of the world's outstanding types.

Originally designed as a luxury airliner; converted and developed during the war as a troop carrier; and reconverted into an airliner when the war ended—that is the beginning of the Constellation story. Things could not have worked out better for Lockheeds, for the vast amount of money and time expended in getting all the "bugs" out of the Constellation troop carrier did, at the same time, get most of them out of the Constellation airliner. Thus, soon after the end of the war, Lockheeds were able to offer a modern airliner already tried and proven and this, coupled with a well-planned and vigorous sales campaign, led up to the present situation where Lockheeds have delivered, or have orders for, over 400 Constellations. An amazing figure!

The 184,000-lb Constitution in company with a Beechcraft. The wing spans, respectively, are 189ft 1in and 47ft 7in.



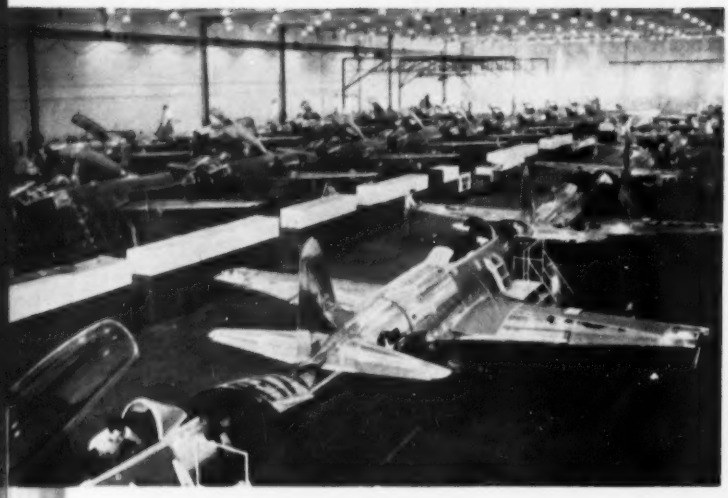
Britain's Foreign Secretary, Mr. Anthony Eden, is among the distinguished visitors who have made a grand tour of the Constitution's double-decked interior. The two Constitutions built have been used by the U.S. Navy.

Although the degree of comfort in the early post-war "reconverted" Constellations was good, it was not up to the standard that had been envisaged when the aircraft was first designed and so changes were made to improve the comfort of passengers; and at the same time the performance was improved by the fitting of more powerful engines. This was the Model 649. A development, the 749, is identical except that new outer wings are fitted, holding an additional 500 gallons of fuel to give a maximum range of over 5,000 miles at 220 m.p.h. This is the famous Gold Plate Constellation.

The latest version is the Model 1049, or Super Constellation. With the fuselage lengthened by 18ft to accommodate up to 97 passengers, the 1049 has a cruising speed of 327 m.p.h. at 21,500ft. Present models have four Wright Cyclone C.18CA (or CB) engines developing 2,700 h.p. As the operation of this improved type requires little extra in the way of crew-training and airport equipment, it was to be expected that it would be viewed favourably by many of the airlines using earlier versions and thinking of re-equipping their fleets. The fact that the 1049 had been designed for easy conversion—first to compound power units, and later to turboprops when these become available commercially—was also an obvious sales feature; but even the most optimistic executive in the Lockheed sales department must have been overwhelmed by the actual response. This was such that Lockheeds had orders for over 60 of these new £500,000 Super Connies before the first one had flown.

Variants include a civil cargo version, the Model 1049B—able to carry up to 36,000 lb of freight for 2,000 miles—and two military sisters, designated by the Navy R7V-1 and by the Air Force C-121C. The Navy has already placed an initial order for two R7V-2s, powered by Pratt and Whitney T-34 turboprops, for development purposes.

The second quite different type of aircraft developed by Lockheeds since the end of the war is the huge double-decked Constitution. With a span of 190ft, it is surpassed in size in the U.S. only by the Convair bombers and Boeing YB-52, XC-99 and the Hercules flying boat. Fully loaded it weighs 184,000 lb, or some 50 tons less than the Bristol Brabazon. Although it was recently re-engined with four 3,500 h.p. Pratt and Whitney Wasp Majors, it is still underpowered and—like the Brabazon—will not be able to reveal its real capabilities until turboprops are fitted. The Constitution is a truly magnificent monument to aerodynamic research and constructional ingenuity, but, as in the case of the Brabazon, the wealth of time and money lavished on its creation will



Production of T-33 tandem-seat jet trainers. This type, which closely resembles the F-94 night and all-weather fighter, is one of many derivatives of the original Shooting Star.

TRANSATLANTIC VARIETY . . .

have been largely wasted unless some sort of useful duty can be found for it to perform.

In this respect the Constitution has been more fortunate than its British counterpart, for the two aircraft built have both been used for one or two flights carrying U.S. Navy personnel who really wanted to go somewhere and were not just taken up for the ride.

The third quite different type of aircraft actively developed by Lockheeds since the end of the war is the P2V or, more familiarly, the Neptune.

The Neptune was originally laid down during the war as a long-range land-based patrol bomber to relieve the Boeing Superfortresses allotted to this work. As it was intended for very long ranges in the neighbourhood of 5,000 miles, the human factor of physical exhaustion resulting from long hours in the air received particular attention. The result was almost an "airliner" degree of comfort, and upholstered bunks and a soundproofed fuselage ensure complete rest and relaxation to crew-members off duty.

It is by no means the medium-sized aircraft that photographs so often suggest it to be : it is actually about the same size as a Lancaster, with a wing span of 100ft and a weight of 58,000 lb. It was a Neptune, the now-famous *Truculent Turtle*, which in 1946 flew 11,236 miles non-stop from Perth, Western Australia, to Columbus, Ohio, thereby gaining the world's long-distance record, which it still holds.

Since its introduction in 1945 the Neptune has been the principal land-based anti-submarine weapon of the United States Navy. The latest versions have been fitted with compound engines to give an improved range and performance.

In 1950 a number of P2V-5 Neptunes were allotted to both Britain and Australia and small Service delegations from the two countries have visited the United States to gain first-hand experience of them before taking delivery of their new aircraft and flying them home.

The P2V-5 carries appreciably more radar and electronic equipment, in addition to a heavy armament, than any previous model. The new design is thus more of a sub-hunter-killer than merely a patrol aircraft. Chief external differences apparent in the P2V-5 are the new nose-turret and the redesigned, centrally-mounted wing-tip tanks. Flight tests proved that stability is improved with the tanks in this position rather than under the wing. In addition to fuel the tanks house extra radar equipment and a searchlight.

Because of its useful range and other qualities, the Neptune is in many ways suitable for rescue work, and an air/sea rescue version has been developed. Equipped for such operations over land, sea, ice and snow, the A.S.R. Neptune assumes a different appearance for different assignments. For sea rescues an airborne lifeboat is carried slung under the fuselage, and for arctic rescue work skis can be fitted over the wheels of the normal landing gear.

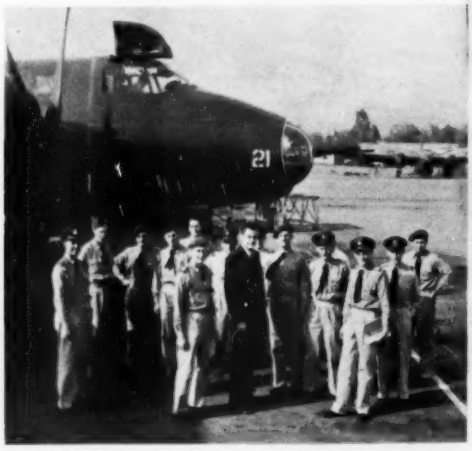
The F-80, or Shooting Star, which would have occupied the entire resources of even a fair-sized aircraft company, is the fourth basic Lockheed type under concurrent development. It has been what might be termed Lockheed's bread-and-butter type in the difficult post-war period.

As the first tactical jet aircraft of the U.S.A.F., the Shooting Star has played the same rôle as the Gloster Meteor and de Havilland Vampire have in the R.A.F. It arrived too late for operational use in the war, but it did, nevertheless, attract the public eye and imagination even before it had its baptism of fire over Korea.

In 1947, the P-80R, a special Shooting Star, flew four times over a three-kilometre course above the Mojave Desert at an average speed of 623.8 m.p.h., and thus wrested the world's most coveted speed record from Britain, whose 616 m.p.h. had been established by a Meteor some nine months earlier. That the record has now been pushed up even higher, first by the Douglas Skystreak and then by the North American Sabre, does not diminish a fine performance or detract from the well-earned attendant prestige.

In 1948, sixteen F-80s flew from the United States to Great Britain over the North Atlantic shortly after Vampires had made the very first jet crossing in the reverse direction.

Three main variants of the Shooting Star have been produced—the single-seat fighter F-80 series A, B and C; the two-seat trainer T-33 and the radar-equipped "all-weather" two-seat fighter F-94. F-80Cs, which bore the brunt of the early jet fighting in Korea, and have since been reinforced by Thunderjets and Sabres, may soon be joined by the later F-94s. Up to now the F-94s have been reserved for groups guarding atomic plants in the Pacific North-West areas of the United States and New York.



Personnel of R.A.F. Coastal Command with one of the Neptunes with which they have been familiarizing themselves prior to delivery of machines of this type to the United Kingdom.

Super-Constellations on the line. This type is designed for easy conversion to turboprop power. In its piston-engined form it has a maximum cruising speed of 327 m.p.h. The later version may use tip-tanks.

The United States appears to be concentrating on three more or less distinct types of fighter :—

(1) For long-range "penetration" and escort duties.
(2) Interceptors for high-altitude bomber interception.
(3) "All-weather" type, mainly for bad weather and night fighting duties.

The latest Lockheed fighter, the F-90, obviously a development of the Shooting Star, falls squarely within the first category, being a heavy-weight single-seat fighter with a long-reaching punch. "Heavy-weight" is no exaggeration, for the normal take-off weight is around 28,000 lb and with wing-tip tanks holding 440 gallons each this goes up to over the 30,000 lb mark. When it is recalled that current American jet fighters weighing about 15,000 lb have ranges of up to 1,500 miles, it will be realized that the long-reach-punch claim should be no exaggeration either.

The F-90 retains a surprising number of classic Lockheed "trademarks" in view of the near-sonic nature of the expected performance. The wings and tail surfaces all have rounded tips and the elevators are cut back to permit an uninterrupted rudder movement. Wing flaps are of the highly efficient and traditional Fowler type, but gone are the numerous projections from the trailing edge usually associated with this form of component, and the flaps retract as neatly as the more popular split type.

With a length of 55ft, the fuselage is big for a single-seat fighter and houses two Westinghouse J-34-WE-22 axial-flow turbojets of 3,200 lb thrust, mounted side by side. The wing is swept back the now familiar 35 deg, and has a maximum thickness : chord ratio of only 8 per cent. Such a thin wing did, of course, necessitate a good deal of structural testing in the development stage, and the use of extremely high-strength alloy-steel spars.

In order to keep abreast (and, if possible, ahead) of potential competitors in the development of such diverse types as the Super Constellation, Neptune and the F-90, a tremendous amount of research has been necessary and a vast amount of new and often costly machinery has been installed. The latter includes a 1,000-ton impact-extrusion press for the quick production of parts in the new and stronger alloys now being used, and a £130,000 milling machine capable of machining sheets over 30ft long by 4ft wide. This is used in the manufacture of integrally stiffened one-piece skin-panels that by traditional methods of construction were complicated assemblies composed of about 1,500 different parts and 5,000 rivets. The saving in man-hours is obvious, and skin-panels made this way, for the same weight, are much stronger. The pioneering processes for this development alone took six years. These two machines, together with others, are housed in a building appropriately entitled the "Hall of Giants."

Of course, not all of Lockheed's ventures have been successful. The much-publicised Saturn twin-engined feeder liner and the Little Dipper private-aircraft projects both fell by the wayside. Yet to prove itself is the new L-206 now on the drawing board, a project for a turboprop-engined freighter. Absent from this design are the fine aerodynamic lines of past Lockheed aircraft, to be replaced by the squat form of a highly-utilitarian fuselage. Designed specially for the economic handling of bulky cargo, the L-206 has large cargo-doors aft and a floor only 45in above ground level.

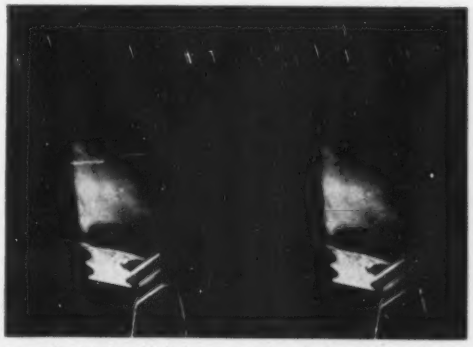
The L-206 represents a venture by Lockheeds into yet another specialized field of aircraft design—that of freight transport. The number of existing aircraft designed *from the outset* for such work is countable on one's fingers, so a need certainly exists. This, together with the fact that a civil version should be possible, with a minimum of alterations for use by the airlines, may well mean that Lockheed's record £500,000,000 backlog of orders will soon be even higher.

FLUORESCENT DETECTION

A FLUORESCENT ink, known as "Glo-Mor" and developed by the physics department of Manchester Oil Refinery, Ltd., offers a useful medium for non-destructive crack detection in a wide variety of materials—for instance, light alloys, non-ferrous alloys, stainless steels and plastics.

The piece to be tested is dipped in the fluorescent ink, or alternatively has a few drops of the ink poured over the appropriate surfaces, and, after allowing approximately one minute for the surface to become dry, the test-piece is inspected under an ultra-violet light source, e.g. a Model 15 Hanovia lamp. Surface cracks reveal themselves by their brilliant green fluorescence which can, in fact, be clearly seen even against a background of redundant green fluorescent material.

Typical applications of the method include aluminium and magnesium alloys forming structural members of aircraft or engines, turbine blades (which can be inspected *in situ*) and welded plates or other welded structures which might have shrinkage cracks or porosity. Plastic materials can easily and quickly be examined and further applications include the inspection of alloy pistons, stainless steel parts and the detection of cracks and holes in the various components of hydraulic systems.



An anodised turbine-blade before (right) and after (left) application of the fluorescent ink. Surface cracks are made clearly visible.

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Racing Specifications

HANDLING reports on the Mew Gull and Ambrosini S.7 that have appeared in *Flight* have made interesting reading. In a contemporary U.S. journal, "Slick" Goodlin writes a similar type of article. He recently tried the *Cosmic Wind* (one of the Goodyear Trophy midgets). For comparison, I repeat some of the data, which might be subject to correction :—

S.L. max. speed	195 m.p.h.
Stalling speed	60 m.p.h.
Initial climb	1,600 ft/min
Ceiling	18,000 ft
Take-off distance	140 yd
Range	375 miles
Wing loading	18 lb/sq ft
Weight empty	820 lb
Rate of roll	120 deg/sec

The report cites the absence of frills in the cockpit (no blind flying panel is mentioned). The forward vision was of the order of the Mew Gull's, although the pilot could take a reasonable peek over the engine when flying straight and level. The roll was of Tomahawk variety : a dead straight barrel-roll could be held almost indefinitely by bashing the pole over with a trace of rudder in the same direction.

The stall, reasonably straight and preceded by judder; cockpit, tailor-made to fit each pilot; construction, remarkably enough, all-metal; wings, laminar-flow of area to comply with racing regulations; engine, Continental flat-four apparently untuned except with regard to type of fuel; undercarriage, of Cessna spring-steel type, complete with brakes; prop, two-bladed fixed pitch (race regulation).

Though not as fast as the Mew Gull, possibly because it is considerably less powerful, it is nevertheless an interesting machine (with readily available spares for most parts), although the "Midget Mustang" series, now in production and of roughly similar design, has an initial cost of 6,000 dollars. Whew !

These midgets have been mentioned as suitable for rattling close-support "grasshopper" or "mosquito" aircraft.

During the war, Bell produced an amazing midget with this end in view. I think it carried the designation XP-30 and had the well-tried inverted, six-in-line Ranger engine in a craft the size of the Mew Gull, but with 360 deg bubble canopy vision and retractable undercarriage. With 500 b.h.p. in hand they claimed 330 m.p.h. (?). Construction was mostly wood, and armament two 0.303 m.g.s (?). The wing loading was not stated, but to judge from the thin, high-aspect-ratio little stubs on either side of the engine, it must have been pretty high, and probably the designers could not match the performance needed at the other end of the speed scale, or we would have heard of further prototypes.

St. James, South Africa. A. LOUW.

[Our correspondent's letter makes particularly interesting reading in conjunction with the article on page 713. Incidentally, we believe he is thinking of the Bell XP-77, which had a twelve-in-line engine of over 500 h.p., achieved, it is said, over 400 m.p.h., and had one 20 mm and two 0.5in guns.—ED.]

Historical Preservation

I AM in full agreement with Mr. Rupert Moore's suggestion, in his letter of May 2nd, that more attention should be paid to the apparently less important details of historic aircraft.

Having recently spent much time in search of details going back to 1914, I discovered in our museums a very real lack of accurate information and in some cases complete blanks in continuity. On these occasions I had to fall back on my memory of that period, and it seems that much information of this kind is arrived at in the same way, since no official records exist from which to check facts. Each successive year thins the ranks of the early enthusiasts and it would appear to be a wise move to establish a reference centre for historical details while those who remember apparently unimportant facts are still capable of recording them.

Memory is still fresh of the controversy provoked by the camouflage of the Portuguese Hurricanes borrowed for the filming of *Angels One Five*. A mere eleven years after the Battle of Britain and there was doubt about the war-paint of the fighters that wrote the most glorious page in the history of the Royal Air Force !

I have for many years thought that the ideal way of treating historical aircraft would be to withdraw one of the last of the species in service and preserve it in that condition. The difficulty here is that the machine may by that time have been modified far beyond its original specification and not be very true to type. This would then give rise to anomalies like the Battle of Britain Spitfire masquerading in the Imperial War Museum in 1942-43 camouflage. She may well have been an actual Battle of Britain fighter (though this seems doubtful), but not withdrawn from service until 1943. Extreme accuracy of detail should always be observed in museum exhibits.

Individual shades of a given camouflage colour seem to vary considerably. I was indebted in 1950 to Cellon, Ltd., who lent what must have been very valuable shade-cards, actual painted samples on fabric of the colours used in the First War. These, however, were at variance with my own samples, comprising sections of fuselage and wing coverings and roundels taken from crashed and scrapped aircraft—B.E.2D and E, D.H.6, R.E.8 and Bristol Fighter.

My memory of the aircraft of this period is clear, as I used to spend most of my holidays at North Cerney, or Rendcombe, aerodrome, near Cirencester, and Minchinhampton, part of which is now Aston Down. The under surfaces of the wings were generally clear-doped on unbleached linen, this resulting in a soft biscuit colour. It would appear historically incorrect to have the underwing surfaces of the Shuttleworth Dove/Pup painted a dark colour, which necessitates outlining the roundels in white. This was the standard treatment for top wing and fuselage sides of those days. The S.E.5As and Dolphins at Minchinhampton were clear-doped underneath and camouflaged on top and sides right up to 1919. The pretty shape of the S.E.5A in the South Kensington Museum should never have been completely covered with drab brown, but it would probably be a major operation to restore her original condition now.

The Australians training on 504Ks at Minchinhampton in 1918 used to carry, behind the fuselage roundel, a red band with white kangaroo superimposed. I have never seen a reference to this insignia and should like to know if it appeared in other units.

Little Eaton, Derby. J. V. CAMPBELL-WHITE.

[For those who possess them, of course, bound volumes of *Flight* dating back to 1909 preserve a considerable amount of information; but there must necessarily be a lack of data on such subjects as camouflage, which during a war inevitably come under security bans.—Ed.]

Registration Lettering

I READ with keen interest the letter by Mr. P. F. Wright, of Birmingham, in your issue of May 23rd, and also endorse his thanks to you [for publishing registration letters, where possible, when mentioning aircraft].

I, too, am a very ardent spotter and recorder of civil aircraft registrations; my records date back to 1934.

Much to my regret, I have a very particular grouse which has recently made the identification of aircraft operated by B.E.A. and B.O.A.C. in particular very difficult, even with a good pair of binoculars. I refer, of course, to the great reduction in size of the actual lettering, and the transfer of fuselage lettering to the tail unit in many cases.

It would be interesting to learn from the Corporations why this change has taken place and what advantage is gained.

Kingston-on-Thames. M. J. SELL.

FORTHCOMING EVENTS

June 14. Girl Guides Association: Air Ranger Flying Pageant, Sywell, Northampton.
June 14. Auster Flying Club: Rally, Rearsby.
June 14. R.A.F.A.: Air Pageant, Sydenham, Belfast.
June 14. London Aeroplane Club, Vintage Aeroplane Club and Herts Auto and Aero Club: At Home, Panshanger.
June 14-15. Wines and Chateaux of Aniou Rally, Angers.
June 14-15. Aéro-Club de Charente Maritime: Pons Rally.
June 15. R.Ae.S. Garden Party, White Waltham.
June 18. Aircraft Recognition Society: Contest, London.
June 21. Boston Aero Club: Display.
June 21-22. Aéro-Club de Basse Normandie: Flers Rally.
June 22. Aéro-Club de Savoie: Aix-les-Bains Rally.
June 24. Golf: R.N. v. R.A.F., Sandwich.
June 25. Golf: R.A.F. v. Army, Sandwich.
June 27. London Aeroplane Club: Midsummer Dance, Hatfield.
June 28. R.N. Air Station Eglington: Air Day.
June 28-29. Aéro-Club d'Eure et Loire: Rally, Chartres.
June 28-29. R.Ae.C.: La Baule Rally.
June 29. Northern Heights Model Flying Club: Gala Day, Hawker Airfield, Langley.

Do you know your airfields?

23

Recognise this airfield? It's No. 23 in this series of puzzle photographs. You'll find the answer below on the right.★

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COMPANY MEETING

THE BRISTOL AEROPLANE COMPANY LIMITED

ANNUAL GENERAL MEETING, 1952

CHAIRMAN'S SPEECH

Ladies and Gentlemen,

The Report of the Directors and the Annual Accounts for the year ended December 31st, 1951, have been circulated and, with your permission, I will take them as read.

BOARD CHANGES

As mentioned in the Report, several changes in the membership of your Board have taken place since the last Annual General Meeting.

Sir Stanley White has recently relinquished the office of Managing Director, but happily he has consented to continue as Deputy Chairman, so that we may look forward to the benefit for many years to come of his unrivalled experience in our affairs.

Mr. George S. M. White and Mr. W. R. Verdon Smith, previously the Assistant Managing Directors of the Company, have been appointed Managing Directors.

Mr. N. Rowbotham was obliged to resign last autumn from his position as Divisional Managing Director of our Engine Division and more recently has retired from the Board altogether. Mr. Rowbotham joined the Company's service in 1922; his work in France during the ensuing years, his energy and initiative in the expansion of our aero engine production prior to and during World War II, and the esteem in which he was held throughout the Industry—all these factors mean that his retirement has been a matter of great regret to his friends throughout the Company.

We welcome the accession to our number of two new colleagues—Mr. A. E. Russell and Air Chief Marshal Sir W. Alec Coryton. Mr. Russell has been in the service of the Company since 1925 and has been the Chief Designer of our Aircraft Division since 1945. We were particularly glad that Mr. Russell's notable contributions to the aeronautical sciences should have been recognized last December by his own University, the University of Bristol, when the Chancellor, Mr. Winston Churchill, conferred upon him the degree of Doctor of Science *honoris causa*.

We count ourselves fortunate indeed that Sir Alec Coryton, after a most distinguished career both in the Royal Air Force and subsequently at the Ministry of Supply, accepted an invitation last November to join our Board and become Divisional Managing Director of the Engine Division.

ACCOUNTS

I will deal briefly with significant items in the accounts, referring as on past occasions mainly to the Consolidated Accounts which reflect the position of the Group as a whole.

The Report contains the names of the Subsidiary Companies whose accounts are consolidated with those of the Parent Company. The list was increased during the year by the formation of Bristol Aeroplane Engines (Eastern) Limited, which acquired the assets of the aero engine repair business of Canadian Wright Limited in Montreal, Canada. Our recently formed business in Australia, to which I will refer later, will be added to the list next year.

Profit and Loss Account

You will see from the Consolidated Profit and Loss Account that the year's operations resulted in a trading profit for the year, after charging depreciation, of £1,349,945—an increase of £231,853.

Income from other sources included an award of £125,000 in recognition of the extensive wartime use for Crown purposes at home and overseas of certain of the Company's designs. This sum has been provisionally earmarked in our forward estimates as a contribution towards the cost of improved engineering training facilities, to which I will refer again later.

The charge for taxation increased from £694,571 in 1950 to £941,455 in 1951, reflecting Income Tax, the higher rate of Profits Tax, and overseas taxation. The charge includes a sum of £75,000 added to the Tax Equalisation Account which is required to avoid disparity between the Inland Revenue Wear and Tear rates as affected by Initial Allowances and the Company's provision for depreciation.

The very high charge for taxation, over 60 per cent of profits for the year, illustrates clearly the heavy burden already carried by Public Companies and the undesirability of adding to this burden additional taxation such as is proposed in the form of the new Excess Profits Levy.

By conventional standards we have again made substantial provision for the depreciation of our fixed assets, the specific charge for the year amounting to £580,344 compared with £367,979 in 1950. But conventional standards are not enough in this matter of depreciation. In the aircraft industry developments in design, materials and manufacturing methods are exceptionally rapid, and major capital expenditure must be incurred continuously to meet changing requirements. One of the first essentials of a strong and internationally competitive industry is that sufficient sums should be set aside annually for the speedy writing off of plant and equipment over a short life so that new and more modern replacements can readily be introduced, and in this respect we cannot regard as adequate the depreciation rates so far admitted by the Inland Revenue. In addition, much of the present capital expenditure of the aircraft industry is related to the Defence programme; elsewhere, for example in Canada and the U.S.A., exceptional rates of depreciation are admitted by the taxation authorities in relation to assets officially certified to have been acquired primarily in relation to their defence programme. Similar recognition should be given to accelerated depreciation in this country. Finally, like others throughout the wider field of industry as a whole, we have to consider depreciation charges in relation to the ever-increasing costs of replacement. We continue of the opinion that to adopt replacement cost as the basis of valuation is to introduce a speculative factor which might well prove as misleading a basis as original cost; on the other hand, special recognition of this dangerous consequence of inflation is essential. Again we get no help from the Inland Revenue, and we have relied as in past years upon the transfer to General Reserve (£271,114 compared with £200,000 in 1950) to meet the increasing costs of replacement. It is regrettable that the resources of progressive undertakings should thus be absorbed by the necessity of keeping pace with inflation instead of being available to consolidate and improve productive strength. The knowledge that the Government's attitude even to the inadequate scheme of initial allowances is due to the need to reduce the level of less essential capital investment does not provide much satisfaction to those whose capital expenditure is essential and must be incurred whatever the handicaps imposed by the combination of high taxation and progressive inflation. It is disappointing that national policy in this matter is not making the progress which the future efficiency of industry demands.

I need hardly say that in present circumstances your Board's policy regarding the final dividend on the ordinary stock has called for careful thought. The costs of replacement, the large demands upon our resources made by an expanding business, the need for moderation in dividend distribution in current national circumstances—each factor has had to be taken into account. On the other hand, we are not unmindful of the rights and proper expectations of stockholders and of the need to encourage investment in an essential industry. Moreover, on this occasion our accounts reflect the final settlement of our liability to tax during the E.P.T. years and provisions amounting to £778,886 (a small percentage of the total tax paid during the E.P.T. years) are no longer required.

As you will have seen from the Report, we have decided that the whole of these provisions, together with £271,114 out of the profit for the year 1951, making a total of £1,050,000, should be retained in the business, and we are recommending that the final dividend should be at the rate of 8½ per cent. This with the interim dividend of 5 per cent paid on October 27th, 1951, will result in a dividend of 13½ per cent for the year, an increase of 1 per cent on the rate for the previous year. The distribution represents a return of just over 5 per cent gross on the Capital Employed.

The balance to be carried forward in the Consolidated Accounts is £405,484 (in the Parent Company's Accounts £260,121) compared with £359,663 (and £248,335) in the previous year.

Balance Sheet

Turning to the Consolidated Balance Sheet you will see that there are several important changes during the year. The net value of Fixed Assets has been increased by approximately £1,000,000 of which one-half represents additions in the Parent Company and one-half the additions made in Subsidiary Companies, principally in Canada. This brings the total of our capital expenditure in the past five years to £4,000,000.

In addition, we are being supplied by the Ministry of Supply on rental terms with a considerable quantity of machine tools and equipment for the purpose of the Defence Programme.

You will observe that outstanding contracts for capital expenditure amounted at December 31st, 1951, to £1,020,487: this does not by any means represent the total of the additional expenditure on fixed assets in which the Company will be involved even during this year and next year in carrying out its increasing programmes.

The net value of stocks and work in progress shows an increase of £1,860,983, from £4,287,249 at December 31st, 1950, to £6,148,232. This increase is due partly to rising costs, partly to the increasing programme of work in hand, and partly to a reduction in the cash received from the Ministry of Supply on account of expenditure on work in progress on their contracts.

Cash and Tax Reserve Certificates together of £3,381,791, are £253,435 less than the corresponding figure of £3,635,226 at December 31st, 1950, and the fact that there is not a more substantial reduction in cash in spite of increases in fixed assets and stocks is partially due to the increase in deposits from customers and partially to an increase in amounts due to suppliers.

The burden of the capital expenditure to which I referred above and of carrying out work for the Ministry of Supply on progress payment terms which do not adequately match the build-up of the Defence Programme will place a strain on the financial resources of the Company.

Capital, Reserves and Surplus have increased by £1,086,479 during the year from £8,049,091 to £9,135,570 and you will see from the Balance Sheet of the Parent Company that the amount of the General Reserve is now £3,300,000—the same as the Ordinary Share Capital—whilst the reserves and surplus of the Group (£5,235,570) exceed the Issued Share Capital (£3,900,000) by £1,335,570. The significance of these figures in relation to the capital structure of the Company has been receiving the consideration of your Board and it is our hope that, subject to official approval, we shall be able to come forward to stockholders in due course with proposals for bringing the share capital more into line with the capital permanently employed in the business.

REVIEW OF COMPANY'S ACTIVITIES

The year 1951 was one of great endeavour, and our activities reflected, and in some respects anticipated, the nation's increasing concentration on the over-riding needs of Export and Defence. The projects upon which we are engaged demonstrate the world-wide character of our business and the need to be fully equal to the exacting task of meeting the keenest international competition in quality, performance, price and delivery. The best evidence of our progress is found in a brief review of some of our major projects.

Bristol Freighters

These aircraft have indeed justified the original expectations which prompted their design and development directly after the war as a private venture. At present we have received orders for close on 200, and to meet

our delivery commitments we are increasing our manufacturing capacity. The *Freighter* is familiar throughout the world. It meets a steadily growing commercial and military need and its sturdy and economical characteristics make it suitable for an astonishing variety of operations. No single type of aircraft has contributed more to the development of new territories. We believe the *Freighter*, because it is simple and practical, has a long and promising future. Already its sales have contributed handsomely to our earnings of foreign exchange, and further opportunities are being vigorously pursued.

Britannia

While *Freighters* are demonstrating their proven worth, *Britannia*—first known by its Design Office designation as the Type 175—is now the centre of attention. The first flight of the prototype is due shortly. We believe that no other aircraft has enjoyed so fully the co-operation of the constructor and the operator; largely as a result of our close and effective collaboration with B.O.A.C. on their order for 25 aircraft, *Britannia* promises to be not only a notable step forward in aircraft engineering but also the first aircraft truly capable of turning the dream of low-cost air travel into reality. Already we foresee *Britannia* taking a leading place on the airlines of the world.

Helicopters

The *Bristol Sycamore*, our single-rotor model, is now in limited production, and is being supplied to the Services both in the U.K. and in Australia. Interest in its capabilities is increasing rapidly, as was evidenced recently by the success of demonstration flights in N.W. Europe. The larger twin-rotor model, the *Type 173*, the world's first twin-engined helicopter, started its flight trials early this year, and development is proceeding. For the future we are looking ahead to a still larger size of helicopter, primarily intended to meet the requirements specified by British European Airways. Helicopters have today earned their place with the Services and with civil operators: recognition of their merit has now to be translated into production in quantity. Our American competitors are going ahead under the spur of military orders. It is an urgent and difficult problem for us and our suppliers to reconcile the speedy development of this prospective new business with the present demands of the Defence Programme but there is a potential world market of great importance which we in this country cannot afford to miss.

Brabazon

In reviewing our Aircraft activities I have left to the last the *Brabazon*. As announced in the House of Commons in March of this year by the Minister of Supply, work on the second *Brabazon* was suspended at the same time as work on the second and third big flying boats. The decision, though a sad disappointment to those who believe in the future of big aircraft, especially on the transatlantic routes, could not be criticized in view of the need for economy in Government spending and for concentrating effort on work yielding an immediate military or economic return. It is satisfactory, however, to note that the Government reaffirmed its confidence in large aircraft and its intention of proceeding when conditions become more favourable. Meanwhile, research and development are being continued with the first *Brabazon* and invaluable data have been obtained greatly to the benefit of aircraft engineering generally.

Bristol Piston Engines

Bristol Hercules and *Centaurus* piston engines, for which we hold substantial orders, continue to play a vital, if unsensational, role in this country's aero-engine programme and in our export trade. You will recall the notable R.A.F. trooping operations to the Middle East with *Hastings* and *Valetta* aircraft, all with *Bristol* engines. Hours flown in 1951 by civil operators of *Bristol* engines approximated to 600,000. To the success of the *Freighter*, *Hercules* engines have made a great contribution. Installed in the *Viking*, their reliability in the experienced hands of B.E.A. is such as to enable us to run, with satisfaction to both parties, an overhaul scheme under which in return for a fixed payment per aircraft hour flown we provide repaired engines at need. This is, we believe, an engine service to operators unique in the world.

Gas Turbines

The *Britannia* is to be powered by four *Bristol Proteus* turbo-prop engines. A large part of our Engine Division's development effort in the past three years and more has been devoted to the *Proteus*. The *Proteus Series II* has received its type approval certificate from the Air Registration Board and is the most powerful turbo-prop engine in the world currently approved for civil flying. The *Proteus Series III* which carries forward the development of the type with much improved fuel consumption, higher powers and reduced weight has recently made a brilliantly successful start to its experimental running and we are confident that in this engine we have an outstandingly fine successor to other engines in the *Bristol* tradition.

Development of the *Bristol Olympus* turbo-jet has gone ahead well during the year. We have now accumulated a most satisfactory background of bench-testing which has given us good grounds for confidence in the *Olympus*, to which we attach the highest importance: development of this entirely new engine up to the flight stage has taken an unusually short time since the project was started, and we look forward to having the engine in the air for the first time very soon.

As you may suppose, other important projects are in progress in both Aircraft and Engine Divisions, but of these I am not at liberty to speak today.

Cars

Exports of *Bristol* cars were seriously affected by the Australian import cuts. This was but one of the difficulties, such as the limitation of materials supplies, sustained by the motor industry in recent months. None the less, the reputation of the *Bristol* car is going from strength to strength, and the recent successes of the *Bristol* 2-litre engine in the Frazer Nash and Cooper racing cars have attracted widespread interest throughout the world in our products. Shortly a third British make of racing car using the *Bristol* engine will make its first appearance.

Buildings

Our Housing Company, now renamed The Bristol Aeroplane Company (Weston) Ltd. owing to its widening range of activity, continues to develop and supply buildings, mostly Schools, both at home and overseas. Difficulties created by the Australian decision to limit imports persist, but are on the way to a partial solution.

Rotol Ltd. and British Messier Ltd.

Progress has been satisfactory and both these Associated Companies have large orders arising from the Defence Programme. Lieut.-General Sir John Evetts, C.B., C.B.E., M.C., joined the Board of Rotol Ltd. in September, 1951, and was appointed Managing Director. Under his energetic leadership extensions to manufacturing capacity and large scale subcontracting are being arranged to meet rising production schedules: despite assistance from the Ministry of Supply in the provision of machine tools on rental terms, additional borrowing from the Parent Companies has been necessary.

OVERSEAS DEVELOPMENTS

Canada

The period under review has seen a further expansion of our Canadian interests. Following the formation in Canada of Bristol Aeroplane Engines (Eastern) Ltd., and its acquisition of the engine repair and overhaul business previously carried on by Canadian-Wright in Montreal, we have acquired a fine site in Montreal North on which construction of a new factory will shortly commence. We believe that the rapid development of Canada offers splendid opportunities for aviation and the aircraft industry.

Australia

The prospects of growing activity in Australian aviation have led us to form The Bristol Aeroplane Company (Australia) Proprietary Limited of which we are very glad that Sir John Storey has undertaken to be Chairman. The new Company has taken over from our friends the Overseas Corporation (Australia) Ltd., who formerly acted as our agents, sales representation for Bristol products and is arranging to provide engine and aircraft repair facilities at Sydney and to carry on other developments as opportunity offers.

France

Our associate, S.E.C.A., which operates aircraft and aero engine repair shops at Le Bourget, had a successful year.

DEFENCE PROGRAMME

On top of a large and varied manufacturing programme directed primarily to the needs of the airlines and to export, we have devoted an increasing effort, in both Aircraft and Engine Division, to our guided missile programme, the significance of which can be gauged by the application of the super-priority symbol to our contracts.

As a contribution to the aero engine section of the Defence Programme we are preparing for the production of Rolls-Royce Avon engines, and as a declaration of our welcome to the Royal Canadian Air Force fighter squadrons coming to this country as a feature of Western Defence we have undertaken to look after the repair of their Canadian-built F.86 Fighters and their American General Electric Company J.47 turbo-jet engines.

To meet these new obligations, as well as to achieve a full measure of success in our own projects, we are strengthening our managements, increasing our facilities, and adding to our manpower. Skilled labour is as scarce in the Bristol area as elsewhere, and we have had recourse to exceptional measures to overcome this handicap. Among such measures, we have set up a branch Works near Sunderland, where skilled labour is more readily available, and I am glad to report that this project has made most encouraging progress in a short time, demonstrating what resourceful management can do to overcome difficulties. We have also received an invaluable allocation of houses for key workers willing to come to Bristol from a distance and it is encouraging to see this feature of the Government's housing programme beginning to play a useful part in enabling skilled men to move to essential jobs without sacrificing either their houses or the presence of their families. The local authorities in Bristol, Sodbury and Thornbury have been most public-spirited and helpful and deserve our cordial thanks.

No one who has the interests of this country at heart can fail to recognize the burden which the Defence Programme is imposing upon our impoverished economy. For us, as I said last year, it is an overload upon our peaceful plans for civil aviation, and it may dangerously restrict our export trade. The claims of defence are paramount and we shall do all we can to achieve and where possible exceed the promises we have given: at the same time we cannot relax our most strenuous efforts to expand our export trade, and for this vital purpose we are justified in claiming every assistance the Government can give to supplement our own endeavours.

TRAINING

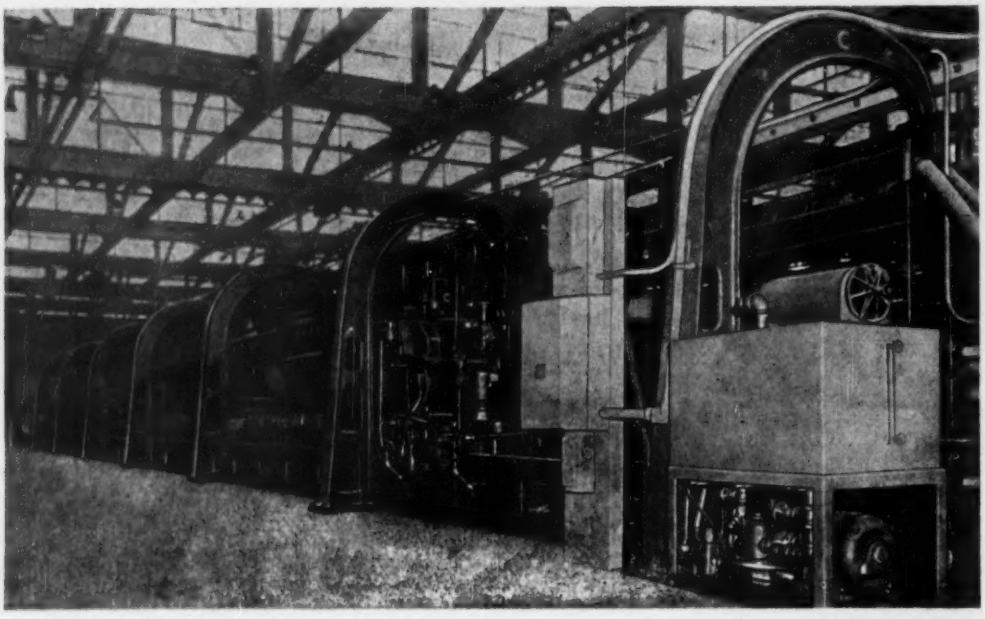
We regard the recruitment and training of our engineering and trade apprentices as of the greatest importance to the Company's well-being. This is the principal source of the brains and skill upon which we depend for future success. In the Company as a whole our students and apprentices of all grades number nearly 1,000. The school and workshop facilities which seemed more than adequate in years gone by can no longer meet the demands placed upon them and we are planning to provide, as soon as we are permitted to build, a new School with greatly improved laboratory, workshop and classroom facilities.

WORKS RETIREMENT BENEFIT AND LIFE ASSURANCE SCHEME

During the year we have been paying particular attention to life assurance and retirement arrangements for our workpeople, and at the end of 1951 we introduced a scheme for hourly paid workers which goes far in supplementing the National scheme and thereby providing a greater sense of security and stability throughout the Company. Such a scheme must depend, as we have made clear to the beneficiaries, on the continued prosperity of the business. We hope and believe that we can look forward to such prosperity in the years ahead.

APPRECIATIONS

All the achievements and endeavours to which I have referred would, of course, be impossible without the loyal service and hard work of all our staff and workpeople. It is my hope and belief that they have a real and well-justified pride in our great enterprise: to them I extend our warmest thanks and with them we look forward with confidence to keeping the name of Bristol in the very forefront of aviation progress.



Typical of Canadair's fine equipment:
a huge spar cap milling machine.

WHAT IS CANADAIR'S *Production Capacity?*

Canadair's production capacity is something that never fails to amaze the many executives of the industry and military officers visiting the plant.

It is a capacity great enough to handle the simultaneous production of 3 types of military aircraft . . . for the Royal Air Force, the Royal Canadian Air Force and the United States Air Force.

It is a capacity great enough to have built fleets of luxury airliners for Trans-Canada Air Lines . . . British Overseas Airways Corporation . . . Canadian Pacific Airlines . . . and military transports for the Royal Canadian Air Force.

It is a capacity that has the key production essentials . . . facilities, men, designers, engineers and experience . . . a potential of definite interest to those with future plans to buy aircraft.

For further information: European Representative, J. H. Davis, Princes House, 190 Piccadilly, London, W1, England.

Vignettes of
CANADA—AIR LAND

A few weeks ago a large Canadian Corporation took delivery of a greatly modified C-47 — remodelled into an efficiently equipped office.

In a country of vast distances like Canada, business executives constantly face problems of time lost in travel. The 'flying office' is a typical Canadian answer.

In dozens of ways, from executive work to prospecting for oil, Canadians continue to make the airways an essential part of daily business.

Canadair
LIMITED, MONTREAL, CANADA

CIVIL AVIATION

INDEPENDENTLY TO AFRICA

SATURDAY, June 14th, will see the opening of the new weekly service between London and Nairobi operated jointly by Airwork, Ltd., and Hunting Air Transport, Ltd. The service, which has been named "Safari," has been described as "C-rate"—denoting that it offers slower travel over shorter stages in less luxurious aircraft but still with a "high degree of personal service." Both companies will use Vikings, which will take two-and-a-half days for the journey with night stops at Malta and the Sudan in both directions. The fares, £98 single and £180 return (compared with £140 and £252 "first class"), include the costs of coach service between airport and terminus, baggage allowance of 66 lb and meals and accommodation *en route*. Services will be flown alternately by the two companies. Aircraft will in each case carry 27 passengers, attended by an air hostess.

Huntings and Airwork will continue to fly from their own bases at, respectively, Bovingdon and Blackbushe, and will operate their aircraft and crews under their own insignia and uniform. Tickets will be interchangeable, allowing passengers to take advantage of the co-ordinated frequencies. Both companies have considerable experience of operating the London-Nairobi route on a contract and charter basis. Their new combined service is, of course, to be operated under an associate agreement with B.O.A.C. Inaugural flights scheduled to reach Nairobi on June 16th will be made by both companies.

This announcement, foreshadowed in *Flight* of May 23rd, follows closely the Government's promise to increase opportunities open to private operators at home and abroad. The Hunting-Airwork Service is intended to be complementary to rather than competitive with the faster B.O.A.C. Comet and Hermes services on the same route. Its progress will be closely studied, and the lessons learned may have a direct influence on the opening—or otherwise—of further overseas services by independent companies.

THE HERMES INQUIRY BOARD

IT was announced by B.O.A.C. on June 4th that Sir Miles Thomas, chairman of the Corporation, in accordance with the announcement already made by him that a full official investigation would be held into the recent off-course landing by a Hermes in French West Africa, has appointed a board of inquiry which will meet in London. The board will sit as soon as the members of the Hermes crew are available to give evidence. Chairman of the board will be Major J. R. McCrindle, adviser on international affairs to B.O.A.C. and a barrister-at-law; the other members will be Mr. H. L. Newlands (another member of the board of B.O.A.C., who deals particularly with trade union relations), Capt. O. P. Jones, senior captain of B.O.A.C.'s Stratocruiser and Constellation Fleet, and Nav. Off. H. E. Smith, Comet Fleet navigation officer.

The aircraft, Hermes IV G-ALDN *Horus*, made a forced landing 90 miles N.N.W. of Atar on May 26th. Although the port wing was torn off only slight injuries were suffered among the ten passengers and crew of eight; however, F/Off. Haslam died from heat exhaustion on May 31st. It is reported that no attempt will be made to salvage the aircraft.

CENTRE OF ATTRACTION at San Diego Airport recently was the first Convair 340 to be delivered to United Air Lines. As reported overleaf, the company has 40 more on order and may acquire a further ten.

CENTRAL AFRICAN PLANS

CENTRAL AFRICAN AIRWAYS (writes a Johannesburg correspondent) want to operate their own trunk air service from Salisbury to London and also to establish a cheap tourist fare service from Central Africa to the United Kingdom. This has recently been made clear by Mr. Robert McCoy, the general manager, whose progressive ideas have done much, in the last two years, to put the company's services on the African map.

It is improbable that either B.O.A.C. or S.A.A., in their joint operation of the Springbok service, are keen to see Mr. McCoy's plans come to fruition, although he has emphasized that the Central African operator wishes to work in close co-operation with both the present partners in the African trunk routes. Commenting on the prospect of B.O.A.C. Comets using the new Salisbury airport later this year, Mr. McCoy said that the public interest demanded that Salisbury should have a trunk service to London as soon as possible; traffic arising in Salisbury warranted a new service, and Salisbury should not be relegated to the position of being merely a stop to add to the traffic on the existing Springbok service. With regard to a cheap fare service between Central Africa and London, he said it was C.A.A.'s intention to do its utmost to obtain the requisite Government approval for such a service. This proposal was again recently discussed with Sir Miles Thomas, chairman of B.O.A.C. Previous discussions took place in Salisbury last December with the primary object of finding a way to protect C.A.A.'s existing passenger and mail revenue once the B.O.A.C. Comet service passes through Salisbury, taking with it traffic now conveyed by C.A.A. between Johannesburg/Salisbury and Salisbury/Nairobi.

Mr. McCoy emphasized that this traffic was worth a great deal every year to C.A.A. and said that two Comets a week alone could reduce the corporation's revenue by £100,000 a year. This estimate presupposed that only nine of the 36 seats in each Comet would be available for traffic from and to Salisbury. Obviously these few seats were quite inadequate and it followed, therefore, that if and when the trunk services were stepped up the loss to C.A.A. would become progressively more serious. The result might well mean that C.A.A. would have to ask the Governments

SIR FREDERICK TYMMS (centre), U.K. delegate to I.C.A.O., signs the protocol of extension of the agreement on North Atlantic Ocean Weather Stations. With him are (left) Dr. Edward Warner, president of the I.C.A.O. council, and Mr. E. C. R. Ljungberg, secretary-general of I.C.A.O. The occasion is further *reported on page 726.*

CIVIL AVIATION . . .

concerned for a heavy subsidy and impose a steep increase in existing fares, whereas C.A.A. had successfully resisted increases for several years while during the same period practically all other airlines had made increases.

Although reluctant to say more about the proposed C.A.A. service to London, Mr. McCoy hinted that a Viking might be used in the development phase and that it was C.A.A.'s ambition that the one-way fare to London from Central Africa should not exceed £100.

When C.A.A.'s plans became known in Johannesburg, prospective passengers immediately took the line that it would be cheaper by far for them to fly to Salisbury by either C.A.A. or S.A.A. in order to join the London service there. As the effect of the loss of such traffic could be serious for the partners in the Springbok service, it might be necessary to find a means whereby only *bona fide* Central African residents, or returning visitors to those territories, would be allowed to book on direct C.A.A. services to London.

There is no confirmation of persistent rumours that C.A.A. intends to lease Hermes aircraft from B.O.A.C. for the Salisbury/London service.

SYCAMORE'S SUCCESSFUL TOUR

THE Bristol 171 Sycamore helicopter which left Filton on May 11th for a 1,500-mile sales tour returned on May 30th in the hold of a Silver City Freighter. The flight (from Stockholm) was the third occasion on which this type of helicopter has been carried by a Freighter; a Sycamore was taken to Khartoum by Freighter for tropical trials last year, and another was delivered to the R.A.A.F. in Australia by the same method.

During the tour the 171 kept closely to its scheduled programme, giving flight demonstrations in Brussels, the Hague, Hamburg, Copenhagen, Oslo and Stockholm. Greetings from the Lord Mayor of Bristol were delivered to civic officials in each city. All the demonstrations excited keen local interest—particularly in Belgium, where the helicopter undertook 4½ hours' intensive flying on mail services between principal cities and towns. Mr. C. T. D. Hosegood, pilot throughout the tour, was accompanied by Mr. A. G. L. Langfield, technical sales representative, and flight engineer Mr. R. Francombe. The sales manager of Bristol's aircraft division, Mr. W. R. Farnes, followed the Sycamore's route by airline and road.

NEW K.L.M. HANGAR

ONE of the largest hangars in Europe, capable of accommodating six four-engined aircraft, was officially opened at Schiphol on May 29th. The building, which is flanked by modern office premises with a canteen above them, was handed over to K.L.M. by the city of Amsterdam and formally named "Kingsford-Smth Hangar" by the Australian Ambassador to the Netherlands. The interior of the hangar measures 540ft by 130ft and the height of the entrance and the width of the doorways are respectively 40ft and 250ft.

FUEL RESTRICTIONS LIFTED

WITH the virtual end of the strike at oil refineries in the United States, all restrictions on the supply of aviation fuel to operators of civil aircraft in the U.K. ceased to apply on Sunday last, June 8th. Most operators were able to announce practically immediate resumption of full schedules. Of the two British Corporations, the more severe losses were suffered by B.E.A., whose services were reduced by about 50 per cent. Reductions in B.O.A.C. schedules were computed to average 39 per cent. The financial effects of the fuel shortage have not yet been assessed.

WEATHER-SHIP AGREEMENT

AT Montreal, on May 29th, delegates of eight member-nations of I.C.A.O. agreed to extend for one year the agreement by which 25 ships are maintained in the North Atlantic on weather-patrol duty. The ships provide navigational assistance to trans-atlantic aircraft and, if necessary, search-and-rescue facilities. The arrangement is running so efficiently that Dr. Edward Warner, president of the I.C.A.O. council, was able to announce that the agreement need not be revised until next year. Sir Frederick Tymms, U.K. representative in I.C.A.O., signed the protocol of extension on behalf of Britain. Three other participating nations are expected to sign next week.

NEW CONVAIRS FOR U.A.L.

THE first of forty Convair 340s ordered by United Air Lines was formally handed over at Lindbergh Field, San Diego, on May 24th. Taking delivery, Mr. W. A. Patterson, the president of United, said that it was the first time in his 20 years' experience of air transport that he had seen a new type of commercial aircraft delivered on schedule. The 44-seat, 270-m.p.h. Convair 340s are referred to as "Mainliners" by U.A.L., who expect to order an extra ten aircraft; the value of the United contract for 340s will then reach some £10,400,000.

"Flight" photograph

DEMONSTRATOR: A loud-hailer beneath the fuselage was part of the equipment carried by this Bristol 171 Sycamore during its recent 1,500-mile tour. Details of its journey are given in the adjacent paragraph.

BREVITIES

THE B.O.A.C. operational crew members (excluding stewards and stewardesses) who fly Stratocruisers and Constellations between London, Montreal and New York, have each made, on average, 140 crossings of the North Atlantic. Highest-scoring pilot—with 373 crossings—is Capt. L. V. ("Buddy") Messenger, and the record for any B.O.A.C. crew-member is held by Eng/Off. E. D. Gilbertson, who has made 381.

* * *

Examinations for radio maintenance engineers, and corrections to aeronautical charts, are the subjects of new *M.C.A. Information Circulars*—Nos. 49, 50 and 51.

* * *

Doman Helicopters, Inc., are now offering a commercial version of their YH-31 military helicopter; with seating for seven, the civil model is one of the largest helicopters available under C.A.A. certification.

* * *

The appointment is announced by T.C.A. of Mr. C. S. Hewett as operations manager of the company's Atlantic region. Formerly a radio operator on Cunard ocean liners, Mr. Hewett joined T.C.A. in 1938; he now succeeds Mr. F. M. McGregor, who has resigned.

* * *

Mr. B. G. Porter, administrative director of B.O.A.C., spoke on air travel at the recent annual conference of the Chartered Institute of Secretaries. He quoted some impressive statistics illustrating the growth of air travel, reminding delegates that the number of air passengers throughout the world had increased from 2½ million in 1937 to over 39 million last year.

* * *

B.E.A. are studying methods of increasing turn-round speed by more precise and synchronized execution of individual ground operations. The first experiments have been carried out at Ringway, where the average time of a transit stop, formerly 20 minutes, has been reduced by at least half.

* * *

New appointments made at the sixth session of the Assembly of I.C.A.O. on June 3rd include those of Mr. J. P. Barringer as president and of Col. B. M. Amarante (Brazil), A. Kofoed-Hansen (Iceland), Dr. R. Sugoto (Indonesia) and Herr Bisang (Switzerland) as vice-presidents. Mr. Lewis Lang of South Africa was chosen as the chairman of the administrative commission. The new president, whose term will continue during the current session at I.C.A.O. headquarters in Montreal, is director of the Office of Transport and Communications Policy of the American State Department.

* * *

For the third successive year, the efforts of B.E.A.'s sales branch have secured an award presented by the British Direct Mail Advertising Association on the basis of annual competition. This year the prize was awarded for the best "single-shot" letter of the year—one written in ten languages and directed to philatelists in countries served by B.E.A. under covers bearing Festival of Britain stamps.

FROM THE CLUBS

ONE of the first firms to take advantage of the new business houses flying-club scheme (introduced last November by the M.C.A. in collaboration with the A.B.A.C.) is Smith's Aircraft Instruments, Ltd., whose employees are to fly, at Denham, at the modest rate of 10s an hour. We understand that the same airfield will shortly welcome three more firms.

Denham Flying Club, incidentally, logged 187 hr during May, bringing its total for the year to 661 hr. Nine members were awarded P.P.L.s and at present 15 students are under training. The club has recently parted with one of its Magisters, G-AIUE, thus reducing its fleet to two Autocrats, one Taylorcraft and one Magister. On receiving its contingent of A.T.C. Cadets, Denham will commission an extra Maggie.

Like many other clubs, Denham has lately found it necessary to increase its flying rates—in this case by 2s 6d, thus making the charges £2 7s 6d (dual, Magisters), £3 5s (solo); £3 2s 6d (dual and solo, Autocrat); £2 17s 6d (dual and solo, Taylorcraft). Two full-time instructors are now employed, Basil Maile having recently joined in this capacity, and a part-time instructor is available also at week-ends.

SINCE the beginning of the year the London Aeroplane Club has logged no fewer than 950 hours of flying; some 18 first solos have been made and 18 P.P.L.s awarded. Flying members now total 306, 106 of whom are under instruction. Eight A.T.C. cadets have obtained their P.P.Ls. since the beginning of the year; two are now under training, and one of them, Cdt. C. J. Woosnam, has recently gone solo.

The L.A.C. Fleet consists of two Chipmunks, five Tiger Moths, one Moth Minor and one Auster. In addition, the Hornet Moth G-AEET has now been put into flying trim again and is owned by a member. The L.A.C. is, we believe, the only club in the country to operate two Chipmunks, for which they charge only £3 5s per hour, dual or solo. These rates, incidentally, are standard for all L.A.C. types. One interesting machine to be found in the hangars at Panshanger is the Swedish Embassy's Saab Safir, which is frequently in use and which is entered for the *Daily Express* Race this year.

Five enthusiastic members of the club are the Carnegie family: Mr. Donald Carnegie, owner of Messenger G-AGPX, saw his eldest son, David, make his first solo in a Chipmunk, while David's brother John is due to solo on his 17th birthday, in August. The youngest son, Michael, although only 15, is (according to Mr. McBeath, the C.F.I.) quite capable of obtaining his P.P.L. Their father himself only learnt to fly quite recently, while Mrs. Carnegie is an expert navigator.

THE Vintage Aeroplane Club's handling competition, held on May 31st, was won by C. A. Nepean Bishop flying the club's Avro Cadet, G-ACHP. Ron Gillman (V.A.C. chairman), in his Avro Avian, G-ABEE, was adjudged second; and the Tipsy B, G-AFSC, piloted by H. G. Davies of the Cardiff Ultra Light Aeroplane Club, was third.

As always, Mr. Bishop put up an impeccable performance which gave many of the lookers-on their first opportunity of seeing the capabilities of the Cadet demonstrated. After the aerobatics a formation fly-past was staged by the Avian, the Cadet and, in place of the usual Cirrus Moth, a Tiger.

At the general meeting, held later in the afternoon, various points of interest were discussed; among them was the suggestion that several formation-flying teams should be formed—one consisting of three Tipsies, another of three Hornet Moths, and others of assorted aircraft. A modelling section, concerned with the building of vintage model aircraft only, is being started under the leadership of M. L. Garrett, one of the club's non-flying members.

The club has been invited to visit Holland at the end of the month, when three members will give demonstrations and displays—Pat Fillingham, Arthur Marshall and Ron Gillman, with the Cirrus Moth, Cadet and Avian respectively.

If the Continental rally arouses sufficient enthusiasm, plans will be made to hold an international rally towards the end of the year.

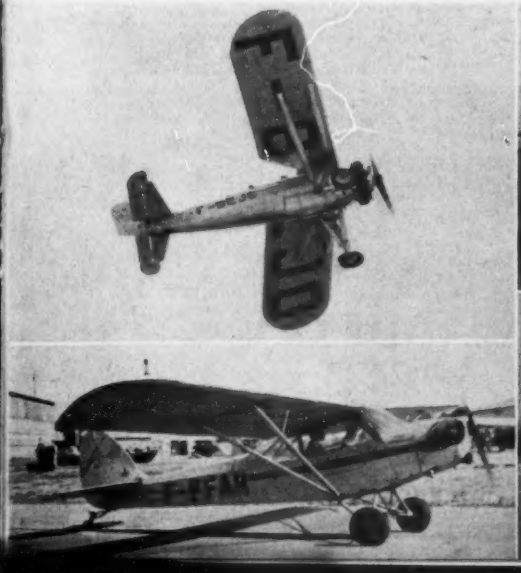
THE Penguin Flying Club, which now operates four Austers from Gatwick, appears to have settled down in its new quarters at Gatwick and to have had a very successful month. The "penguins" have apparently acclimatized themselves to operating from a large expanse of grass (doubtless a pleasant change from their single runway at Elstree) and during May four first solos were achieved; P.P.L.s have also been obtained.

Dual instruction is available at this club at only 45s per hour, and, in addition, the club has a main-line railway station almost literally on its doorstep, making it extremely convenient for London.

THE Strathtay Aero Club accumulated some 105 hours of flying during May; the best day total for the month was 18 hr 20 min, which was logged on Saturday, 31st. One club member and two A.T.C. cadets qualified for their P.P.L.s and two members were successful in winning prizes in the Paris week-end rally.

VISITING pilots and aircraft landing at Newcastle-upon-Tyne Airport (Woolsington), on Friday, July 11th, for the National Air Races may do so before 17.30 hr B.S.T., and, on Saturday, July 12th, before 11.45 hr. Members and associate members of the Royal Aero Club arriving by air will be granted free admission to the Royal Aero Club enclosure on both days. Notification should be sent to the Air Touring Department of the Royal Aero Club before Friday, July 4th, giving details of pilot, passengers, type of aircraft and registration.

FRENCH FOURSOME : Among the varied collection of light and sporting types present at the recent Toussus-le-Noble rally organized by the Aéroclub de France were : (top left) the venerable Salmson-powered M.S.230 and, on its right, the second prototype of the Paul Aubert P.A.204, now equipped with dorsal-fin extension; below left is the Ansaldi-powered Bagimer, a "one-off" two-seater constructed by the local club; at bottom right is the four-seater Boisavia Mercurey (140 h.p. Renault) which, as will be seen, has abundant window-area.



LAST WEEK-END'S EVENTS

V.R.s Compete

THE annual competition between the Reserve Schools of No. 61 Group, Home Command, took place at R.A.F. Station Kenley last Saturday. Teams of Chipmunks from six schools took part in the pilots' section, and Ansons from the same units competed for the crew award. Weather was excellent, and the standard of flying high. It was a pity, therefore, that lack of publicity within the Reserve units and elsewhere resulted in only a small attendance.

Last year's winners, No. 18 R.F.S., Fairoaks, were again top in the pilot competitions with a total of 252 marks, their team of three Chipmunks giving an almost faultless display of formation flying and the individual pilots making admirable simulated forced landings. The individual aerobatics were also of very high standard. No. 15 R.F.S., Redhill, came second with 242½ marks, and No. 24, R.F.S. Rochester, third with 205. The remaining three were No. 22 Cambridge (171); No. 17, Hornchurch (137½); and No. 1, Panshanger (135½).

In the crew competition, thanks largely to excellent work on the part of their signaller, No. 24 R.F.S. were the winners of a very close-fought competition—their aggregate was 169 marks followed by No. 17 (160½), No. 22 (159); No. 18 (157½); No. 1 (154); and No. 15 (150). The combination award went to No. 18.

It is our belief that more could be made of competitions of this kind, which give rise to friendly rivalry among the schools and provide an aim and incentive to reach high standards among Reserve pilots whose flying curriculum is inclined to be limited, and at times dull, and whose only real aim at present is to obtain an instrument rating and complete their annual 40 hr commitment.

R.N.F.C. At Home

DESPITE evil weather, the Royal Naval Flying Club held a very successful At Home at Gosport on Sunday. Over 20 light aircraft arrived, including two Geminis and a Messenger, Reliant and Cub, together with a selection of Austers, Tiger Moths and Magisters. Two of the pilots—Mrs. Dykes (Auster) and Lt-Cdr. Gunner (Magister)—received prizes (for, respectively, time of arrival and distance flown) from Rear-Admiral C. E. Lambe, president of the Club.

Present also were Sir Richard Fairey and his son, Mr. Richard Fairey, who piloted a Rapide from White Waltham.

The brief flying programme, carried out to plan within the limitations set by weather, was opened by three R.A.F.V.R. Chipmunks from Hamble with some lively formation manœuvres. Lt-Cdr. Sothern, flying an S-51 Dragonfly, contributed an excellent selection of helicopter antics; and the R.N.V.R., represented by Seafires from Bramcote and Fireflies from Ford (four of each) made some impressive attacks at tree-top height before signing-off with a joint fly-past.

During its three years of post-war existence, the R.N.F.C. has operated under the difficulties common to most flying clubs. Its fortunes now show signs of improvement, however; full flying membership stands at 68, and there are also about 50 non-flying and overseas members. The club has four aircraft—two Tipsies, an Auster and a Tiger Moth.

Some Admiralty support for the R.N.F.C. is now forthcoming, in the shape of a contract for training approximately 40 sub-lieutenants per year up to the solo stage. These officers, mostly drawn from the executive branch, will receive their flying instruction free, but for a small contribution towards insurance (representing about 2s 6d per flight).

U.L.A.S. Entertain

IN very pleasant surroundings at their airfield base at Booker the University of London Air Squadron, whose commanding officer is W/C. A. V. Rogers, A.F.C., held an evening flying display and cocktail party last Saturday, June 7th. The flying programme included a Chipmunk formation with Squadron pilots led by S/L. W. E. Farrow, A.F.C.; gliding and non-powered aerobatics by No. 126 Gliding School; and a stirring display by F/L. G. R. Gordon, commander of the Meteor Squadron at C.F.S.

After this, a Chipmunk was made to perform some truly remarkable manœuvres by F/L. J. K. Hough, A.F.C., from Farnborough. He performed tail slides, an inverted spin, and a half bunt as well as the more usual aerobatics in the course of an instructor-and-pupil act, with F/L. P. I. H. Courtney in the other machine. The Royal Air Force Central Band played.

Five More for Hayhow?

SUBJECT to confirmation, five more point-to-point records—his Easter batch of 18 were confirmed last week-end—now stand to the credit of T. W. Hayhow and his modified Auster Aiglet Trainer, G-AMOS (130 h.p. D.H. Gipsy Major I).

On Saturday last, June 7th, he took off from Fairoaks at 6.45 a.m. and was clocked-out as he flew over R.Ae.C. timekeepers at Brooklands. He then set course for Berne, where he landed at Belp airfield after 3 hr 21 min, a speed of 141.11 m.p.h. for the 472 miles. After 28 min on the ground he returned in 4 hr 15 min 28.8 sec (111.03 m.p.h.). His time for the round trip was 8 hr 4 min 46 sec (117.02 m.p.h.).

A little over a week before—on Friday, May 30th—he had left Fairoaks with Copenhagen-Kastrup, 617 miles distant, as his objective, flying at a take-off weight of 2,202 lb. The outward trip was made in 5 hr 13 min 24.2 sec (118.115 m.p.h.). After 28 minutes on the ground he returned, against strong head-winds, in 6 hr 14 min 49 sec, representing a speed of 98.76 m.p.h.—just too low to rank for a record. The round-trip time, however, was admissable at 11 hr 56 min 28.8 sec (103.33 m.p.h.).

The Auster carried the same equipment as during the Easter attempts, an account of which appeared on page 515 of *Flight* for April 25th. The only modification was the reversion to a tailwheel in place of the skid originally fitted in the hope of a slight reduction in drag; Hayhow found that the skid wore away disconcertingly fast.

Gliding Record Claimed

SUBJECT to confirmation, a gliding speed record over a course of 100 km was broken last Saturday by Lt.-Cdr. Antony Goodhart, R.N., who averaged 27.2 m.p.h. on a cross-country flight from Basingstoke (aero-tow release at 2,000ft) to Lympne, a distance of 93 miles.

This Week-end

THE coming week-end (June 14-15th) will be another active one in competition, social and display flying. On Saturday the Auster Flying Club is holding its rally at Rearsby (2.15 p.m.); the Air Ranger section of the Girl Guides Association has a big flying display (2 p.m.) at Sywell, Northampton, at which the salute will be taken by the Vice-Chief of the Air Staff; the R.A.F.A. is holding its pageant at Sydenham, Belfast; and the London Aeroplane Club, Vintage Aeroplane Club and Herts Auto and Aero Club have an At Home at Panshanger. On Sunday the R.Ae.S. holds its Garden Party (members only) at White Waltham.

Tornadoes in Norfolk

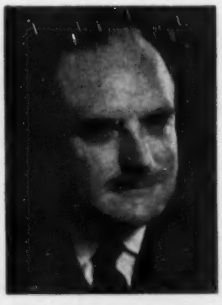
AS recently reported in *Flight*, Sculthorpe, Norfolk, is to be the base of the forty-five B-45C Tornadoes of the 47th Bomb Wing, U.S.A.F., as well as the headquarters of the 49th Air Division of which the wing is a part. Last week-end the B-45s were arriving at Sculthorpe after flying from Langley Field, Virginia, by way of Iceland. As we closed for press some Tornadoes were still held up by bad weather, but were expected at Sculthorpe during the week.

Dowty Australia

YET another branch of the Dowty organization has now been established, this time under the title of Dowty Equipment (Australia) Pty. Ltd.

The headquarters of the new undertaking are to be at Sydney, N.S.W., and in charge will be Mr. Peter Handcock, who recently left England by B.O.A.C. He has been with the parent company since 1937. Before his present appointment he was contracts manager at Cheltenham.

The initial activities of the new company will be in connection with the servicing and repair of Dowty aircraft undercarriage and hydraulic equipment. Mr. Peter Handcock will be assisted in his new duties by Mr. P. W. Long as service manager.



NEW WAKEFIELD DIRECTOR

MR. ARNOLD WATSON, O.B.E., general manager of Castrol sales for the past four years, has been elected to the board of C. C. Wakefield and Co., Ltd. Now 43 years of age, he joined the firm in 1929. During the war, as chief test pilot in the A.T.A., he flew practically all types of British and American operational aircraft.

SERVICE AVIATION

Royal Air Force and Naval Aviation News

Queen's Birthday Honours

ON the occasion of Her Majesty's birthday the following Royal Air Force appointments and awards were published in the "London Gazette."

ORDER OF THE BATH (Military)

K.C.B.

Air Marshal Sir Hugh S. P. Walmsley, K.C.I.E., C.B., C.B.E., M.C., D.F.C., and Act. Air Marshal J. D. I. Hardman, C.B., O.B.E., D.F.C.

C.B.

Act. Air Marshal J. MacConnell Kilpatrick, O.B.E., M.B., B.Ch., D.P.H., Q.H.P. Air Vice-Marshal H. L. Patch, C.B.E. Act. Air Vice-Marshal L. Dalton-Morris, C.B.E. Air Commodores B. E. Essex, C.B.E., G. S. Shaw (Retd) and M. Watson, C.B.E. Act. Air Commodore A. D. Selway, D.F.C. Group Captains L. S. Snaith, A.F.C., and D. M. T. MacDonald.

ORDER OF THE BRITISH EMPIRE (Military)

K.B.E.

Air Vice-Marshal R. A. George, C.B., C.B.E., M.C. (Retd).

C.B.E.

Act. Air Vice-Marshal C. Mc.C. Vincent, C.B., D.F.C., A.F.C., Air Commodores F. W. P. Dixon, M.B.E., M.B., B.S., F.R.C.S., F.R.C.S.(E.), D.O.(Oxon), Q.H.S., and B. D. Nicholas. Act. Air Commodore H. H. Chapman, A.M.I.E.E., Group Captains W. R. Brotherhood, D. Finlay, O.B.E., R. L. Kippenberger, O.B.E., C. Scragg, M.B.E., A.F.C., and C. M. Stewart, O.B.E.

O.B.E.

Wing Commanders A. J. Barwood, M.R.C.S., L.R.C.P., A. A. Baxter, E. H. Lynch-Blosse, E. O. Budd, S. Conway, J. R. Fraser, G. V. Fryer, A.F.C., D. H. M. Graham, A. W. Heward, D.F.C., A.F.C., A. H. C. Roberts, D.S.O., D.F.C., G. E. Tweddle, P. E. Warcup, C. M. Williams and J. Woods. Act. Wing Commanders L. F. Jennings and I. S. Smith, D.F.C. Squadron Leaders K. C. Giddings, D.F.C., A.F.C., and D. D. McSwein.

M.B.E.

Squadron Leaders D. Bower, R. A. Cooper and P. J. Maddaford. Act. Squadron Leader A. B. Chmielowiec. Flight Lieutenants R. J. M. Baron, G. Cairns, L. C. Elliott, W. M. G. Gosden, H. J. Hillyard, W. Hurst, A. B. Landells, D.F.C., R. A. Langton, J. H. Lenaghan, D.F.C., T. J. Millar, D. W. Munro, B.E.M., S. F. Oliver, W. D. Reid, J. B. M. Stableford and W. H. Wheeler. Act. Flight Lieutenants I. Smith and R. A. Wigelsworth, D.F.C. Warrant Officers T. Allen, J. Ballantyne, M. E. Lewis, W.R.A.F., A. McAllister, H. M. North, W.R.A.F., A. R. I. Rawlings, L. W. G. Smith and T. H. Thomason, M. A. Musa Audhali.

BAR TO AIR FORCE CROSS

Squadron Leaders J. Campbell, A.F.C., and A. L. Law, D.F.C., A.F.C., Flight Lieutenants S. J. Hubbard, D.F.C., A.F.C., and C. A. Tomlinson, A.F.C.

AIR FORCE CROSS

Wing Commanders J. B. Holgate, D.F.C., and I. N. M. MacDonald. Act. Wing Commanders A. C. Rawlinson, D.F.C., and C. W. S. Thomas. Squadron Leaders A. Ashworth, D.S.O., D.F.C., E. Cassidy, D.F.C., D. W. B. Farrar, D.F.C., J. W. Foster, D.F.C., R. H. Golightly, D.F.C., D. E. Kingaby, D.S.O., D.F.M., L. A. A. MacKilligin, G. F. Morley-Mower, D.F.C., C. K. Saxelby, D.F.C., and W. E. Thomas. Act. Squadron Leaders L. B. Foskett, J. R. Gibbons and P. N. Speed. Flight Lieutenants R. N. Bates, D. R. Buchan, W. B. Cairns, W. E. Caldecott, A. C. Capper, R. G. Collins, B. R. A. Cox, J. Crossman, D.S.O., W. J. Crozier, A. Deytrikh, W. A. Hardham, D.F.C., P. E. Laird, D.F.C., H. A. Maule, H. L. Mellor, C. D. A. Oxley, E. C. Powles, B. H. Reece, K. Russum, W. G. Shearer, B. W. Slater, F. W. Sledmere, B. G. T. Stanbridge, D. F. White and D. Wood. Master Pilots R. C. Dawe, W. Niezrecki and K. G. Sneller. Master Engineer J. L. Pickersgill.

ROYAL BIRTHDAY FLY-PAST: The Queen, in Guard's uniform, and members of the Royal Family, watch, from the balcony at Buckingham Palace, the fly-past of 18 Avro Shackletons of Coastal Command in honour of Her Majesty's official birthday. The heading photograph shows the Shackletons passing over St. Paul's cathedral. An account by a member of "Flight's" staff who flew in one of the aircraft appears on an earlier page.

SERVICE AVIATION . . .

ROYAL RED CROSS (SECOND CLASS)

Squadron Officers U. H. Mackenzie and A. B. Miller.

AIR FORCE MEDAL

Flight Sergeants J. A. Brindley, R. C. Davis, G. R. Duval, J. Kmiecik, J. Price, D. W. S. Sacree, J. D. Sanders, W. D. Souter, A. M. E. Spencer, J. D. J. Villis and K. H. Wilson. Act. Flight Sergeant L. V. Martin. Sergeants J. R. Brooks, H. J. Moss, D. J. Rhodes, H. Wakeman and R. Watmore.

(To be continued next week)

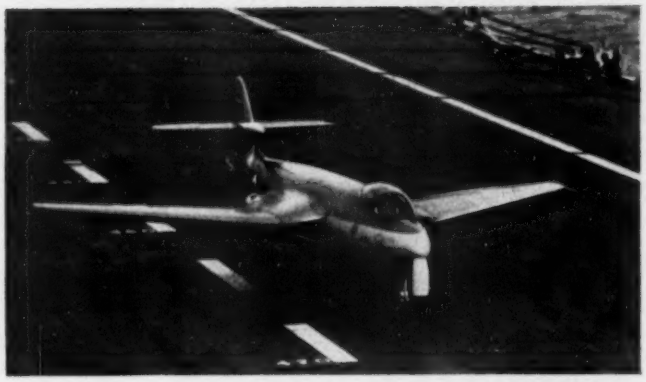
Flag Appointment

AFTER having been employed until last month as the Naval Secretary to the First Lord of the Admiralty, Rear-Admiral W. W. Davis, C.B., D.S.O., is to become Flag Officer (Air) Mediterranean in succession to Vice-Admiral R. A. B. Edwards, C.B., C.B.E. The appointment to take effect next October. This is the first air appointment to be held by Admiral Davis. At the outbreak of war he was in the battle cruiser *Hood*, and in March, 1941, was appointed to the Operations Division at the Admiralty. Later he served as Assistant Director and Deputy Director of the Plans Division until his appointment to the command of H.M.S. *Mauritius* in March, 1943. Admiral Davis was in command of this cruiser when she formed one of the bombarding force during the Normandy landings.

Early in 1948, he was appointed Chief of Staff to the Commander-in Chief, Home Fleet.

Norwegian Memorial

WHEN a Norwegian memorial stone is unveiled at North Weald, Essex, on Thursday next, June 19th, the commander of the Norwegian Air Force, General F. Lambrechts, and the wartime commander of the Norwegian Air Force, General Hjalmar Riiser-Larsen, will be present.



GETTING THE BULLET: In common with the P.1072, the "navalized" Hawker P.1052, seen during deck trials aboard H.M.S. Eagle, now sports a bullet fairing at the intersection of the fin and tailplane. The long-stroke undercarriage, fitted specially for the tests, is non-retractable.

The stone is to commemorate the arrival at North Weald on June 19th, 1942, of the Norwegian fighter squadrons Nos. 331 and 332. North Weald remained the Norwegian fighter pilots' base for the following two and a half years.

No. 601 Entertained

TODAY, June 13th, No. 601 (County of London) Squadron R.Aux.A.F., are leaving this country for a fortnight's training in Malta. Last evening, the squadron was entertained by pre-war officers, including Lord Douglas of Kirtleside (who took the chair) A. Cdre. Whitney Straight, Mr. George Ward, Mr. Aidan Crawley, Sir Archibald Hope, G/C. Max Aitken and A.V-M. Thornton.

"Theseus" Returns

NAVAL aircrews from the Korean War zone arrived at Portsmouth on Friday last, when H.M.S. *Theseus* docked there. The carrier was returning from a six-month tour of duty in the Mediterranean.

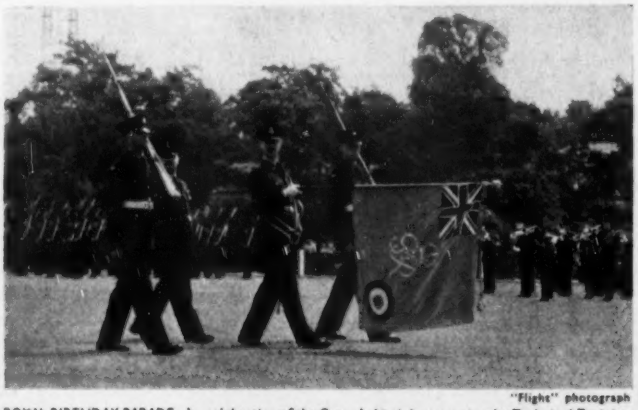
No. 804 Squadron (Lt. Cdr. J. S. Bailey, O.B.E.) and No. 812 Squadron (Lt. Cdr. J. M. Culbertson), after eight months' duty in H.M.S. *Glory*, embarked in *Theseus* at Malta for the final portion of their journey home. With them is Lt. Cdr. F. A. Swanton, D.S.C., Air Group Commander of the two squadrons, but Lt. Cdr. Bailey has temporarily left his unit to gain experience with the American Air Force in Korea.

Longer Naval Runways?

THE Civil Lord of the Admiralty, Mr. S. W. Digby, visited R.N. Air Station, Yeovilton, Somerset, on June 6th, to study problems in connection with the lengthening of the runways there.

R.A.F.A. Annual Conference

THE annual conference of the Royal Air Forces Association is to be held at Douglas, Isle of Man, on June 21st and 22nd. A special boat and boat train are being arranged for conference delegates.



"Flight" photograph

ROYAL BIRTHDAY PARADE: In celebration of the Queen's birthday, a review by Technical Training Command was held at Uxbridge. Marshal of the Royal Air Force Sir John Slessor was the reviewing officer, and with him on the dais were Air Marshal Sir John Whitworth Jones, A.O.C.-in-C. Technical Training Command and A.V.-M. B. V. Reynolds, A.O.C. No. 22 Group, who were responsible for ordering and mounting the parade. The dais is seen on the left and, above, the Queen's Colour, borne by F/L. D. H. T. McRae, D.F.C., is being paraded in slow time to a tune—most appropriate to the occasion—"Elizabethan Echoes."

SMITHS INDUCTOR PRESSURE GAUGE

NEW

(Actual size)

SIMPLIFIED MEASUREMENT OF OIL AND FUEL PRESSURES

Developed in conjunction with the British Engine Manufacturers, the Transmitter of this new electrical pressure measuring system is designed for direct flange mounting on the engine and is entirely unaffected by vibration, as there are no moving contacts.

Indicators may be of the single long scale type or twin scale, and calibrated 0-40, 0-60, or 0-150 p.s.i. for the oil pressure range and 0-75 p.s.i. for fuel pressures.

The equipment requires a power supply of 26 volts 400 cycles and a miniature transformer is available so that the system may be used on the standard 115 volt aircraft supply. The power input to the Transformer is 10 VA at ·5 Power Factor when the circuit contains a single Inductor Pressure Indicator.

Approved by the Air Registration Board and adopted by many British Constructors for Military and Civil Aircraft.

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36DD/55711	Coolant Pump
36DD/100177	Coolant Pump
36FF/11170	Ring Piston Scraper
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We have available a quantity of "Bristol" Hercules 100 Greynose engines. Zero hours with log books and overhaul certificates. Your inquiries are invited.

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Let us give you quotations on Life-Saving Equipment, Dinghies, Lifebelts, Emergency Packs, Dinghy Radios, etc.

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We are approved Aircraft Tyre Traders.

We have a comprehensive stock of "Lodge" and "K.L.G." Aircraft Sparking Plugs. Our "Plug Bay" is fully equipped to clean, overhaul and release all types of aircraft spark plugs. We are fully A.R.B. approved for this service.

Test Equipment Available

Inquiries are invited for all types of Instrument Section, Test Equipment.

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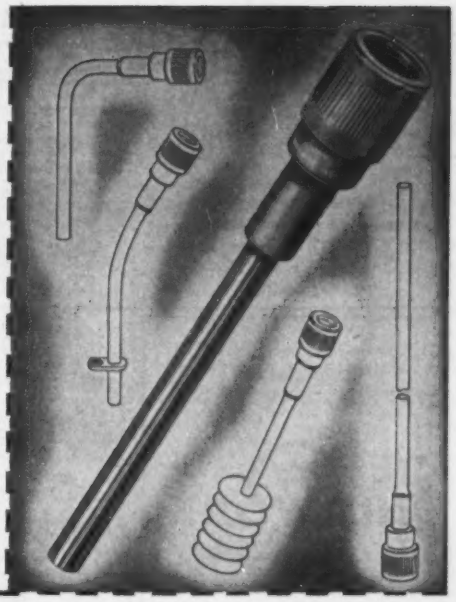

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The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

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APPLY, in writing, to the Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey. Applications with certain exceptions are subject to the approval of the Ministry of Labour and National Service. [8241]

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The firm have in hand an extremely interesting programme of high-speed aircraft design and can offer a position to the right man with good salary and prospects in a progressive organization.

Apply in writing with full particulars to:
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FOLLAND AIRCRAFT LTD.,
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Stressmen are also required
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Write, giving full particulars to the Chief Designer,
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REQUIRED for large factory in S.E. England:—
(a) Engineer with experience of the testing and maintenance of aircraft gyroscopic and servo equipment. H.N.C. standard of education.
(b) Two engineers with experience of the testing and maintenance of airborne electronic equipment. For one post, experience of servo-mechanisms would be an advantage; for the other, experience of radio transmitter-receivers. Must have H.N.C.
(c) Engineer with experience of the testing and maintenance of aircraft hydraulic systems and actuators. H.N.C. desirable.
WRITE, Box F.251, at 191, Gresham House, E.C.2. [8146]

HANDLEY PAGE, Ltd., have vacancies for:—
AERODYNAMICISTS of degree standard or with H.N.C. in aero subjects. Previous experience preferred.
STRESSMEN of degree standard or with H.N.C. in aero subjects. Previous experience preferred.
SENIOR design and intermediate draughtsmen, preferably with aircraft experience, for Cricklewood and Radlett offices. Consideration will be given to applicants with experience in light structural or mechanical engineering. Possession of O.N.C. or H.N.C. (Mech. or Elect. an advantage.
WEIGHT control engineers, with O.N.C. (Mech.). Previous experience preferred.
TECHNICAL assistants of degree or H.N.C. (Elect.) standard for the design and development of aircraft electrical systems. Previous experience preferred. [8221]
SENIOR and junior assistants of degree or H.N.C. standard for the Mechanical and Structural Test Dept. at Radlett.—Write, stating age, qualifications and details of experience, to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [8221]
THE DE HAVILLAND AIRCRAFT Co. Ltd., Airspeed Division, Christchurch Aerodrome, Hampshire, require the following personnel:—
EXPERIENCED general planning engineers.
APPLY to the Personnel Manager of the above firm. [8232]
APPLICATIONS are invited for the following staff vacancies in the Aircraft Division of the English Electric Co., Ltd., at Warton, nr. Blackpool.
1. Experimental engineer for development and approval of testing of aircraft electrical systems. Degree or H.N.C. and practical mechanical electrical engineering experience (Ref. 4366).
2. Aerodynamicist with degree and experience of aerodynamic or aero-elastic investigations on high-speed sweep wing aircraft (Ref. 4351).
3. Stressmen with some aircraft experience and engineering or mathematical degree (Ref. 903D).
4. Mathematician/engineer for investigations into electronic and mechanical methods of aerodynamic calculations. Hons. degree and first-class mathematical ability required (Ref. 958D).
5. Electronic engineer to design and develop equipment for the measurement of physical variable, encountered in wind tunnel and flight-testing departments. Hons. degree and keen interest in this type of work essential (Ref. 965).
PLEASE write, giving full details and quoting appropriate reference, to Central Personnel Offices, English Electric Co., Ltd., 24/26, Cillingham Street, London, S.W.1. [8186]
BUYER for aircraft works, London area. Age 30-35. Aircraft experience and salary required.—Box A.C.7260, Samson Clarke, 57/61, Mortimer Street, London, W.1. [8239]
A VACANCY exists for a flying instructor to a Flying Club in the London area. Good pay and excellent prospects.—Applications to Box 0615. [8238]
COMMERCIAL pilot Auster endorsement wanted summer season, pleasure flights, occasional charter.—Pine's Airways, Ltd., Blackpool Airport. [8240]
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BRITISH INTERNATIONAL AIR LINES, Ltd., Kuwait, invite applications from single engineers, or those prepared to accept separation from their families, who hold C.C. Licence covering Dakota aircraft.
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APPLICATIONS should be addressed to Staff Manager (U.K. Stations and Overseas), (A.E.U.), Airways House, Brentford, Middx, before June 30th, 1952. [8234]
QUALIFIED ground engineer required. Must have A.C. and X licences for engine and airframe Magister, Messenger and Hornet aircraft.—Write to the Scottish Flying Club, Renfrew Airport. [8234]
LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex.—Apply, by letter or telephone, to the Senior Radio Engineer, Aviation Traders, Ltd., Stansted Airport, Essex. Tel.: Rochford 50491. [8260]
PORTSMOUTH AVIATION have vacancies for stressmen of all grades for super-priority work at Portsmouth and Thurn Airports.—Apply: The Airport, Portsmouth.
RADIO mechanics, experienced in overhaul and repair of all aircraft radio gear, including navigational aids and all aircraft radar equipment.—Applicants should apply, stating age and experience, to Box 0680. [8246]
INSTRUMENT mechanics, experienced in overhaul and repair of all aircraft instruments, including electrical types, preferably with some knowledge of electronic instrumentation.—Applicants should apply, stating age and experience, to Box 0659. [8245]
THE HESTON AIRCRAFT CO., Ltd., require senior draughtsmen for work on new projects.—Apply, stating age, experience and salary required, to Personnel Manager, Heston Aircraft Co., Ltd., Heston Airport, Hounslow, Middx. Tel.: SOUthall 2021. [8233]
ELECTRICIANS, experienced in either aircraft wiring or installations, overhauls and pre-flight work, workshop overhaul and repairs to all types of electrical components.—Applicants should apply, stating age and experience, to Box 0681. [8247]
WEIGHT estimator required by Percival Aircraft, Ltd., Luton Airport, Beds., for work on fixed wing and helicopter aircraft.—Apply, giving details of age, qualifications, experience and salary required, to: Manager, Ministry of Labour and National Service, Luton, Beds. [8092]

SITUATIONS VACANT

ASSISTANT chief stressman required by Percival Aircraft, Ltd., Luton Airport, Beds.—Applications, giving full details of qualifications, experience, age and salary required, to the Manager, Ministry of Labour and National Service, Luton. (0598)

TECHNICAL assistants and illustrators required by Percival Aircraft, Ltd., Luton Airport, Beds. Knowledge of M.o.S. procedure desirable.—Applications, in writing, stating age, experience and salary required, to Manager, Ministry of Labour and National Service, Luton, Beds. (0594)

LOFTSMEN required: previous aircraft experience not essential.—Apply: Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey. Applications, with certain exceptions, are subject to the approval of the Ministry of Labour and National Service.

TEST laboratory assistants (male) required by Percival Aircraft, Ltd., Luton Airport, Beds. National Certificate standard and previous experience on design of test laboratory equipment desirable.—Applications, stating qualifications, experience, age and salary required, to Manager, Employment Exchange, Luton, Beds. (0596)

REQUIRED immediately by Percival Aircraft, Ltd., Luton Airport, Beds., several draughtsmen with comprehensive experience of engine installations and allied systems.—Applications, in writing, stating age, qualifications, experience and salary required, to the Luton Employment Exchange. (0601)

H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. (0620)

LANCASHIRE AIRCRAFT CORPORATION, Ltd., Bowlingdon Airport, Herts, require qualified pilots, navigators and radio officers for their York fleet. Only applicants holding appropriate M.C.A. licences will be considered.—Please write full details to the Personnel Manager at above address. (0590)

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TECHNICIANS and draughtsmen required at the Hellicopter Division of Messrs. Saunders-Roe at Whitehall. Selected applicants will be given assistance in finding living accommodation.—Write, stating age, experience, qualifications, salary, etc., to the Personnel Officer, East Cowes, Isle of Wight. (0200)

ROLLS-ROYCE Ltd., Derby, require technicians in their development and technical services departments. Excellent opportunity and scope on super-priority work for graduates or those possessing at least H.N.C. in engineering. Good salaries according to qualifications and experience.—Write to the Employment Manager. (0201)

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HANDLEY PAGE Ltd., require a technical assistant of H.N.C. standard to carry out work on thermo-dynamic problems for aircraft air-conditioning and thermal de-icing systems.—Write, stating age and giving particulars of qualifications and experience, to Staff Officer, Handley Page, Ltd., Claremont Road, London, N.W.2. (0210)

PRESS tool designers and jig designers are required by large engineering company in the Southampton area. Applications are invited from men with the necessary tool room and draughting experience. High salary and good prospects for men with required ability.—Write, Box P.1962, A.K. Advs., 212a, Shaftesbury Avenue, London, W.C.2. (0412)

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THE Aircraft Division of the English Electric Co., Ltd., have vacancies at Warton, near Blackpool, for draughtsmen with experience on the installation of armaments in aircraft.—Please write, giving full details of qualifications and experience and quoting reference "English Electric 1301," to Westminster Employment Exchange, Chadwick Street, S.W.1. (0187)

PLANNING engineer (aircraft) required by Percival Aircraft, Ltd., Luton Airport, Beds. Considerable practical experience of manufacture of metal airframe components and production planning essential qualifications.—Apply to Manager, Employment Exchange, Luton, giving full details of age, qualifications, experience and salary required. (0597)

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APPLICATIONS are invited from senior and intermediate design draughtsmen. Experience of aero-engine design desirable, but not essential. Also checkers. —Please write, stating age and giving details of previous experience in chronological order to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. (0930)

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SITUATIONS VACANT

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HANDLEY PAGE (Reading), Ltd., The Aerodrome, Woodley, Reading, have vacancies in their design office for senior aircraft draughtsmen both electrical and airframe, also for a weights engineer with at least two years' experience. These positions are progressive and offer good scope for advancement to the right men.—Please send full particulars to the Personnel Officer or apply through your Local Employment Exchange. (0674)

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APPOINTMENT will be on probation for short-term contract (with or without bonus) up to six years. Salary scale for short-term contract (with bonus) ranges from £750 to £1,650 and for short-term contract (without bonus) from £900 to £1,650 (annual increases). Starting rate of pay is determined according to age, qualifications and experience of selected candidate. A cost of living allowance which is reviewed quarterly is payable. An outfit allowance of £50 is payable when the contract is signed. No income tax is at present payable in the Sudan. Free passage on appointment. Annual leave after the first tour.—Full particulars may be obtained on application to Sudan Agent in London, Wellington House, Buckingham Gate, London, S.W.1. Please quote "Superintendent A.M. £/2.03." (0633)

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ASSISTANT production engineer capable of checking designs for production of small intricate machined details and assemblies. Familiar with up-to-date machining practice and the use of fine limits and finishes. Experience of final inspection work on guided weapons an advantage. Age range 25-40, salary about £600, according to experience.—Write Personnel Manager, Dowty Equipment Ltd., Arle Court, Cheltenham, preferably in tabulated form, stating age and experience. (0140)

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SENIOR technical assistant required for the Service Department of the de Havilland Engine Co., Ltd., preferably with experience on reciprocating and gas turbine engines. Suitable applicants will be required to work on Headquarters' staff of the Service Department at Leavesden Aerodrome, near Watford, Herts.—Apply in writing, stating age, qualifications and salary required, to the Personnel Officer, The de Havilland Engine Co., Ltd., Leavesden Aerodrome, near Watford, Herts. (0231)

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ROLLS-ROYCE, Ltd., Glasgow, require senior and junior technical assistants for work on technical production and quality engineering. Applicants should have engineering degree or equivalent with previous experience in a similar type of work. Salary will be in accordance with experience and qualifications. Prospects of advancement good.—Applications should be made in writing to the Personnel Manager, Rolls-Royce, Ltd., Hillington, Glasgow, S.W.2, giving full particulars of experience, qualifications, etc. (0152)

TECHNICAL assistant required for publicity section of technical sales department, Smiths Aircraft Instruments, Cricklewood, London, N.W.2. Previous experience of aircraft instruments and allied equipment essential. Candidate should also be capable of preparing technical copy for publication and have had previous experience of publicity. Starting salary approximately £500 per year, depending on experience and qualifications. Profit-sharing bonus, pension scheme. Canteen; 5-day week.—Write, stating age, experience, quoting Reference GP/TEC, to Staff Personnel Manager. (0630)

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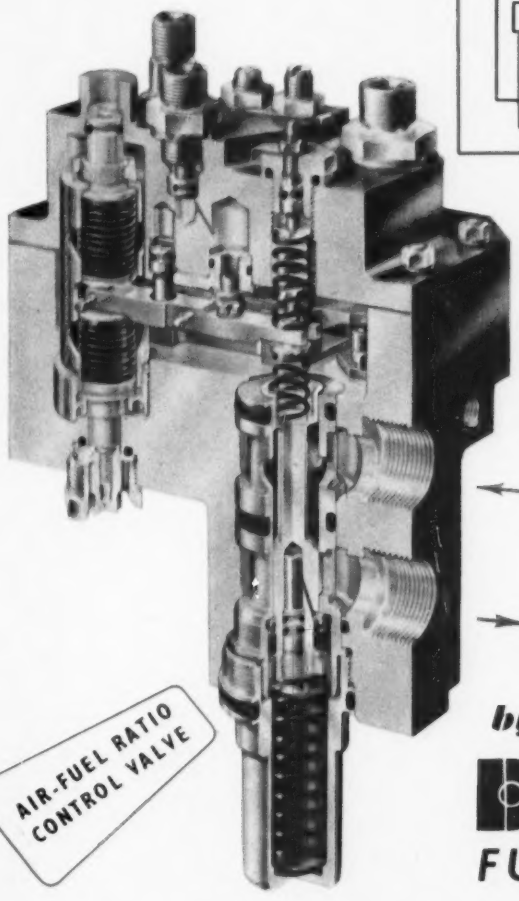

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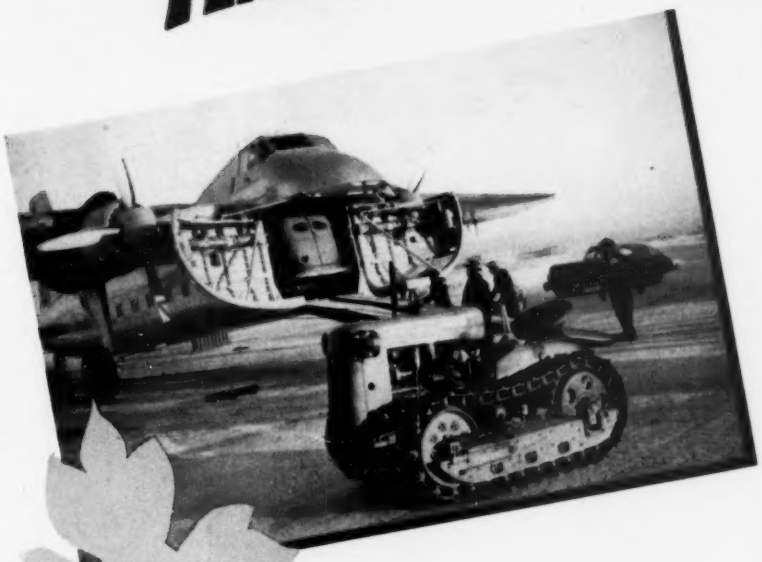

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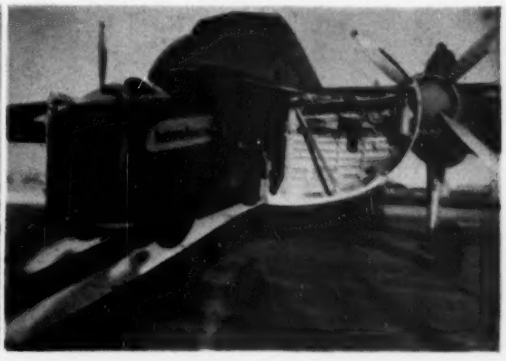

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